

# Installation and Service Instructions

for use by heating contractor

# VIESSMANN

## Vitodens 100-W

### WB1A Series

Wall-mounted, natural gas-fired condensing boiler

For natural gas

Heating input    29 to 100 MBH  
                         8.5 to 29.3 kW

Please file in Service Binder



## VITODENS 100-W



Vitodens 100-W, WB1A  
(with preinstalled coaxial vent pipe adaptor)



### IMPORTANT

Read and save these instructions  
for future reference.

### Safety, Installation and Warranty Requirements

Please ensure that these instructions are read and understood before commencing installation. Failure to comply with the instructions listed below and details printed in this manual can cause **product/property damage, severe personal injury, and/or loss of life**. Ensure all requirements below are understood and fulfilled (including detailed information found in manual subsections).

#### ■ Licensed professional heating contractor

The installation, service, and maintenance of this equipment *must* be performed by a licensed professional heating contractor.

► Please see section entitled "Important Regulatory and Installation Requirements" in the Installation Instructions.



#### ■ Carbon monoxide

Improper installation, service and/or maintenance can cause flue products to flow into living space. Flue products contain *poisonous* carbon monoxide gas.

► For information pertaining to the proper installation, service and maintenance of this equipment to avoid formation of carbon monoxide, please see the Installation Instructions of the Vitodens Venting System.



#### ■ Equipment venting

Never operate boiler without an *installed venting system*. An improper venting system can cause carbon monoxide poisoning.

#### ■ Warranty

Information contained in this and related product documentation must be read and followed. *Failure to do so may render warranty null and void.*



#### ■ Product documentation

Read all applicable documentation before commencing installation. Store documentation near boiler in a readily accessible location for reference in the future by service personnel.

► For a listing of applicable literature, please see section entitled "Important Regulatory and Installation Requirements" in the Installation Instructions.



#### WARNING

Installers must follow local regulations with respect to installation of carbon monoxide detectors. Follow manufacturer's maintenance schedule of boiler.

#### ■ Advice to owner

Once the installation work is complete, the heating contractor must familiarize the system operator/ultimate owner with all equipment, as well as safety precautions/requirements, shut-down procedure, and the need for professional service annually before the heating season begins.

**Safety**

<b>Important Regulatory and Installation Requirements .....</b>	<b>5</b>
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**General Information**

<b>About these Installation Instructions .....</b>	<b>8</b>
<b>Applicability .....</b>	<b>9</b>
<b>Product Information .....</b>	<b>9</b>
<b>Mechanical Room .....</b>	<b>10</b>

**Set-up**

<b>Before Set-up .....</b>	<b>12</b>
<b>Minimum Clearances .....</b>	<b>12</b>

**Boiler Connections**

<b>Preparing the Connections .....</b>	<b>13</b>
Connections overview .....	13
Dimensions overview without bottom connections .....	13
Dimensions overview with connections .....	13
Dimensions overview with connections and alternative drain connection .....	13
<b>Wall Mounting .....</b>	<b>16</b>
Wall mounting bracket installation .....	16
Mounting Vitodens 100-W boiler .....	18
<b>Connections .....</b>	<b>18</b>
Flue gas connection .....	18
Proper piping practice .....	19
Gas connection and piping .....	19
Gas piping pressure test .....	21
Heating water connections .....	22
Condensate connection .....	23
Fill siphon with water .....	23
<b>Safety Connections and Pressure Testing .....</b>	<b>24</b>
Installing safety devices on the boiler .....	24
Performing pressure test on the boiler .....	25
<b>Installation Examples .....</b>	<b>26</b>
Boiler in heating/cooling application .....	34
Boiler with low water cut-off (remote mounted, field supplied) .....	35
Low-loss header .....	36
<b>Venting Connection .....</b>	<b>37</b>

**Control Connections**

<b>Electrical Connections .....</b>	<b>37</b>
Removing the control unit and opening the power pump module .....	37
Electrical connections to the power pump module .....	38
Closing the power pump module and reinstalling the control unit .....	39
Reinstalling the front cover panel .....	39

## Initial Start-up, Inspection and Maintenance

Necessary Tools .....	40
Overview of Controls and Indicators .....	41
Overview of Components .....	43
Procedure (Overview) .....	44
Steps .....	45

## Troubleshooting

Troubleshooting Steps .....	60
Overview of Controls and Indicators .....	60
Changing Room Temperature .....	61
Diagnosis .....	62
Sequence of operation and potential faults during each start-up cycle .....	62
Diagnostics table: Faults with fault display on control unit .....	63
Correction .....	65
Remove front cover panel .....	65
Check boiler temperature sensor .....	65
Check fixed high limit .....	66
Check fuses .....	67

## Additional Information

Technical Data .....	68
Burner Program Sequence of Operation .....	70
Wiring Diagram .....	71
Parts List .....	72
Maintenance Record .....	74
Lighting and Operating Instructions .....	75

## Important Regulatory and Installation Requirements

### Codes

The installation of this unit shall be in accordance with local codes or, in the absence of local codes, use CAN/CSA-B149.1 or .2 Installation Codes for Gas Burning Appliances for Canada. For U.S. installations use the National Fuel Gas Code ANSI Z223.1. Always use latest editions of codes.

In Canada all electrical wiring is to be done in accordance with the latest edition of CSA C22.1 Part 1 and/or local codes. In the U.S. use the National Electrical Code ANSI/NFPA 70. The heating contractor must also comply with both the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1, and the Installation Code for Hydronic Heating Systems, CSA B214-01, where required by the authority having jurisdiction.

→ *Leave all literature at the installation site and advise the system operator/ultimate owner where the literature can be found. Contact Viessmann for additional copies.*

→ *This product comes with several safety instruction labels attached. Do not remove! Contact Viessmann immediately if replacement labels are required.*

### Special Requirements for Side-Wall Vented Appliances In the Commonwealth of Massachusetts

The Commonwealth of Massachusetts requires compliance with regulation 248 CMR 4.00 and 5.00 for installation of side-wall vented gas appliances as follows:

- (a) For all side-wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side-wall exhaust vent termination is less than (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:
  - 1. INSTALLATION OF CARBON MONOXIDE DETECTORS. At the time of installation of the side-wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery back-up is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side-wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professional for the installation of hard-wired carbon monoxide detectors.
    - a. In the event that the side-wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard-wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.
    - b. In the event that the requirements of this subdivision can not be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

*Continued on following page.*

## Important Regulatory and Installation Requirements *(continued)*

2. **APPROVED CARBON MONOXIDE DETECTORS.** Each carbon monoxide detector as required in accordance with the above provisions shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.
  3. **SIGNAGE.** A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, "GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS".
  4. **INSPECTION.** The state or local gas inspector of the side-wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a) 1 through 4.
- (b) **EXEMPTIONS:** The following equipment is exempt from 248 CMR 5.08(2)(a) 1 through 4:
1. The equipment listed in Chapter 10 entitled "Equipment Not Required To Be Vented" in the most current edition of NFPA 54 as adopted by the Board; and
  2. Product Approved side-wall horizontally vented gas fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.
- (c) **MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM PROVIDED.** When the manufacturer of Product Approved side-wall horizontally vented gas equipment provides a venting system design or venting system components with the equipment, the instructions provided by the manufacturer for installation of the equipment and the venting system shall include:
1. Detailed instructions for the installation of venting system design or the venting system components; and
  2. A complete parts list for the venting system design or venting system.
- (d) **MANUFACTURER REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM NOT PROVIDED.** When the manufacturer of a Product Approved side-wall horizontally vented gas fueled equipment does not provide the parts for venting the flue gases, but identifies "special venting systems", the following requirements shall be satisfied by the manufacturer:
1. The referenced "special venting system" instructions shall be included with the appliance or equipment installation instructions; and
  2. The "special venting systems" shall be Product Approved by the Board, and the instructions for that system shall include a parts list and detailed installation instructions.
- (e) A copy of all installation instructions for all Product Approved side-wall horizontally vented gas fueled equipment, all venting instructions, all parts lists for venting instructions, and/or all venting design instructions shall remain with the appliance or equipment at the completion of the installation.

## Important Regulatory and Installation Requirements *(continued)*

### Working on the equipment

The installation, adjustment, service, and maintenance of this boiler must be performed by a **licensed professional heating contractor** who is qualified and experienced in the installation, service, and maintenance of hot water boilers. There are no user serviceable parts on the boiler, burners, or control.

→ *The completeness and functionality of field supplied electrical controls and components must be verified by the heating contractor. This includes low water cut-offs, flow switches (if used), staging controls, pumps, motorized valves, air vents, thermostats, etc.*

Ensure **main power** supply to equipment, the heating system, and all external controls has been **deactivated**. **Close main gas supply valve**. Take precautions in all instances to avoid accidental activation of power during service work.

### Technical literature


Literature for the Vitodens boiler:


- Technical Data Manual
- Installation and Service Instructions
- Operating Instructions and User's Information Manual
- Vitodens Venting System Installation Instructions
- Instructions of other products utilized and installed
- Installation codes mentioned in this manual and as locally applicable

→ *Leave all literature at the installation site and advise the system operator/ultimate owner where the literature can be found. Contact Viessmann for additional copies.*

→ *This product comes with several safety instruction labels attached. Do not remove! Contact Viessmann immediately if replacement labels are required.*


About these Installation Instructions

 Take note of all symbols and notations intended to draw attention to potential hazards or important product information. These include "WARNING", "CAUTION", and "IMPORTANT". See below.

 **WARNING**

Indicates an imminently hazardous situation which, if not avoided, could result in death, serious injury or substantial product/property damage.

→ Warnings draw your attention to the presence of potential hazards or important product information.

 **CAUTION**

Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or product/property damage.

→ Cautions draw your attention to the presence of potential hazards or important product information.

**IMPORTANT**

→ Helpful hints for installation, operation or maintenance which pertain to the product.



→ This symbol indicates that additional, pertinent information is to be found in column three.



→ This symbol indicates that other instructions must be referenced.



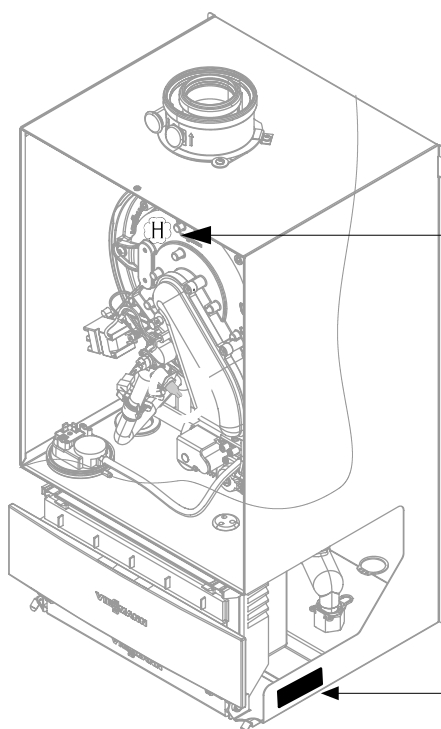
## Applicability

### IMPORTANT

Boiler serial number must be provided when ordering replacement parts. Both the 16-digit serial number bar code paper label and the 12-digit ASME/NB serial number correlate to each other. Providing either serial number is sufficient.

#### Vitodens 100-W, WB1A 8-24, 8-30

Model No.    Serial No.  
WB1A 8-24 7246174□□□□□□□□  
and  
WB1A 8-30 7246175□□□□□□□□



ASME/NB  stamp serial number location (12-digit metallic plate riveted on the heat exchanger)

Serial No. location (16-digit barcode white paper label located on the left or right side of the boiler)

## Product Information

Natural gas-fired wall-mounted hot water heating boiler for space heating.

For operation with constant (set point) boiler water temperatures in closed loop, forced circulation hot water heating circuits. An external controller is required for outdoor responsive control and DHW production.

The Vitodens 100-W comes factory set for operation with natural gas, **with no option of conversion to liquid propane.**

Boiler model must be selected based on an accurate heat loss calculation of the building. Ensure boiler model is compatible with connected radiation.

Vitodens 100 boilers are 100% factory tested and calibrated. No further adjustments are required during field start-up.

To vent this boiler, follow the Vitodens Venting System Installation Instructions.

### Mechanical Room

During the early stages of new home design, we recommend that proper consideration be given to constructing a separate mechanical room dedicated to gas- or oil-fired equipment including domestic hot water storage tanks.

The boiler must be located in a heated indoor space, near a floor drain, and as close as possible to the wall.

Whenever possible, install boiler near an outside wall so that it is easy to duct the venting system to the boiler.

Locate boiler on walls capable of supporting the weight of the boiler filled with water (see section entitled "Technical Data" on page 68 for information required for total boiler weight calculation). Ensure that boiler location does not interfere with proper circulation of combustion and ventilation air of other fuel burning equipment (if applicable) within the mechanical room.

The maximum room temperature of the mechanical room where the boiler is located must not exceed 104°F/40°C.

#### IMPORTANT

##### **Boiler operation in marine environments (damp, salty coastal areas):**

The service life of the boiler's exposed metallic surfaces, such as the casing and fan housing, is directly influenced by proximity to damp and salty marine environments. In such areas, higher concentration levels of chlorides from sea spray, coupled with relative humidity, can lead to degradation of the exposed metallic surfaces mentioned above. Therefore, it is imperative that boilers installed in such environments not be installed using direct vent systems which draw outdoor air for combustion. Such boilers must be installed using room air dependent vent systems; i.e. using room air for combustion. The indoor air will have a much lower relative humidity and, hence, potential corrosion will be minimized.

**Mechanical Room** *(continued)***WARNING**

If you notice fire coming from the appliance, call the fire department immediately! Do not attempt to extinguish the fire unless qualified to do so.

**WARNING**

Fire causes a risk of burns and explosion!

- Shut down the boiler
- Close fuel shut-off valves
- Use a tested fire extinguisher, class ABC.

**Installation area conditions****WARNING**

Incorrect ambient conditions can lead to damage to the heating system and put safe operation at risk.

- Ensure ambient temperatures are higher than 32°F / 0°C and lower than 104°F / 40°C.
- Prevent the air from becoming contaminated by halogenated hydrocarbons (e.g. as contained in paints solvents or cleaning fluids) and excessive dust (e.g. through grinding or polishing work).  
Combustion air for the heating process, and ventilation of the boiler room must be free of corrosive contaminants. To that end, any boiler must be installed in an area that has no chemical exposure.  
The list to the right indicates the main, currently known sources.
- Avoid continuously high levels of humidity (e.g. through frequent drying of laundry).
- Never close existing ventilation openings.

**Sources of combustion and ventilation air contaminants****Areas likely to contain contaminants:**


- New building construction
- Swimming pools
- Remodelling areas, hobby rooms
- Garages with workshops
- Furniture refinishing areas
- Dry cleaning/laundry areas and establishments
- Auto body shops
- Refrigeration repair shops
- Metal fabrication plants
- Plastic manufacturing plants
- Photo processing plants
- Beauty salons

**Products containing contaminants:**

- Chlorine-type bleaches, detergents and cleaning solvents found in household laundry rooms
- Paint and varnish removers
- Hydrochloric acid, muriatic acid
- Chlorine-based swimming pool chemicals
- Spray cans containing chlorofluorocarbons
- Chlorinated waxes and cleaners
- Cements and glues
- Refrigerant leaks
- Calcium chloride used for thawing
- Sodium chloride used for water softening salt
- Permanent wave solutions
- Adhesives used to fasten building products and other similar items
- Antistatic fabric softeners used in clothes dryers

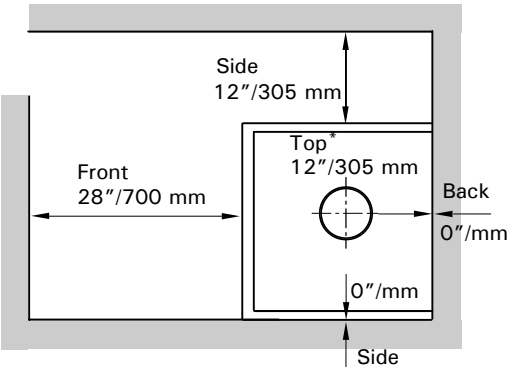
Before Set-up

Before placing boiler in its installation location, ensure all necessary accessories are installed.

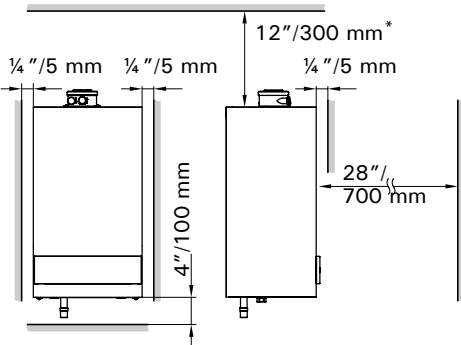
 **CAUTION**

The boiler must be installed in such a way that gas ignition system components are protected from water (spraying, splashing, etc.) during boiler operation and service.

Minimum Clearances



Top clearance - 12". See Vitodens Venting System Installation Instructions.



Recommended minimum service clearances

Refer to the illustrations on the left hand side.

**Note:**  
The Vitodens 100-W boiler has passed the zero inches vent clearance to combustibles testing requirements dictated by the boiler Harmonized Standard ANSI Z21.13. CSA 4.9.2005 and therefore is listed for zero clearance to combustibles when vented with a single wall special venting system (AL-29-4C material) or UL/ULC-listed CPVC gas vent material. The zero inches vent clearance to combustibles for the Vitodens 100-W boiler supercedes the clearance to combustibles listing that appears on the special venting system label.

Clearances to combustibles

Top	Front	Rear	Left	Right	Vent pipe <sup>*1</sup>
0	0 AL, CL	0	0	0	0

AL = Alcove

CL = Closet

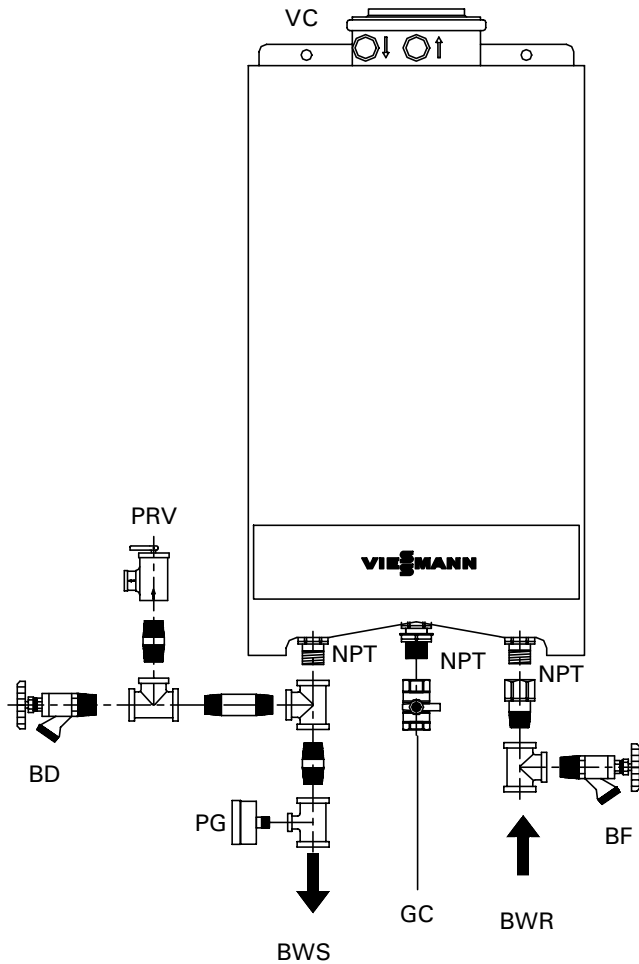
<sup>\*1</sup>Refer to the Installation Instructions of the Vitodens Venting System for details.

## Preparing the Connections

*Use an approved pipe sealant or teflon tape when connecting the following installation fittings.*

### Connections overview

This section constitutes an overview only! Refer to subsequent sections for detailed information on individual piping connections.



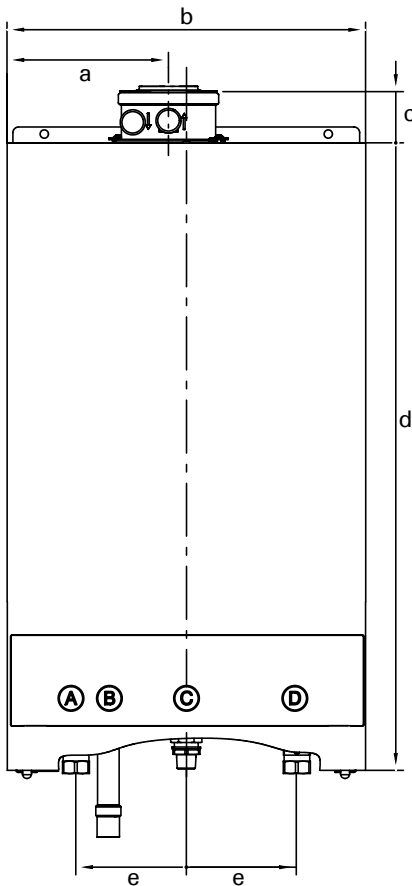
Piping connections for Vitodens  
100-W, WB1A 8-24 and 8-30 (factory  
supplied)

#### Legend

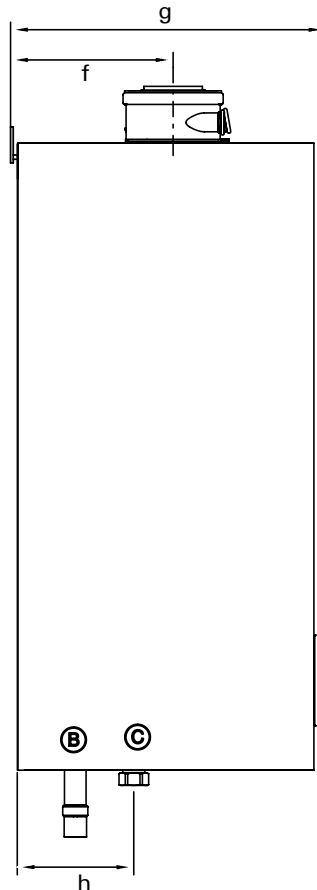
BWR	Boiler water return, $\frac{3}{4}$ "
BWS	Boiler water supply, $\frac{3}{4}$ "
BD	Boiler drain
BF	Boiler fill
GC	Gas connection, $\frac{3}{4}$ " NPTM (male thread)
PRV	Pressure relief valve
NPT	National Pipe Thread
PG	Pressure gage
VC	Vent connection

## Preparing the Connections *(continued)*

### Dimensions overview without bottom connections



Connections Vitodens 100-W,  
WB1A 8-24, 8-30



Vitodens 100-W, WB1A  
side view



When preparing gas, water and electrical connections in the field, see section entitled "Wall Mounting" on page 16 of this manual for information regarding the installation of the wall mounting bracket.

### IMPORTANT

The maximum ambient temperature must not exceed 104 °F/40 °C.

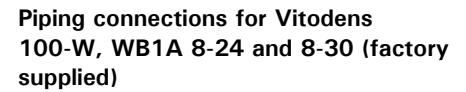
- Heating water connections and gas connection to be made in the field. See illustration to the left and connection-specific section for details.
- See subsection entitled "Power supply connection" for details regarding power supply to the Vitodens 100-W boiler.

#### Legend

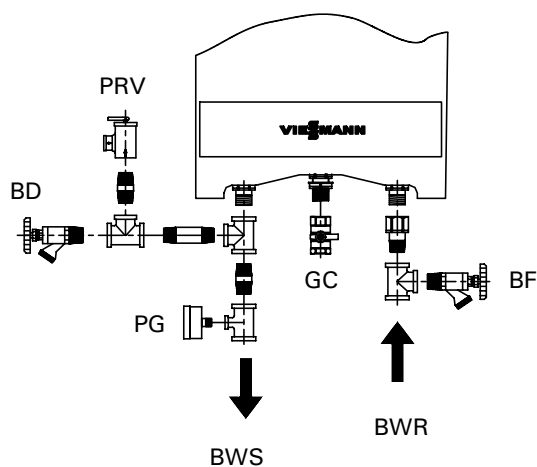
- Ⓐ Boiler water supply, NPT ¾" (male thread)
- Ⓑ Condensate drain, plastic hose Ø 0.87" / 22mm
- Ⓒ Gas connection, NPT ¾" (male thread)
- Ⓓ Boiler water return, NPT ¾" (male thread)

- a 7" / 180 mm
- b 15 ¾" / 400 mm
- c 2 ¼" or 2 7/16" / 58 mm or 62 mm
- d 27 ½" / 700 mm
- e 4 7/8" / 123 mm
- f 7 ¼" / 183 mm
- g 13 3/8" / 340 mm
- h 5" / 125 mm

**This section constitutes an overview only! Refer to subsequent sections for detailed information on individual piping connections.**

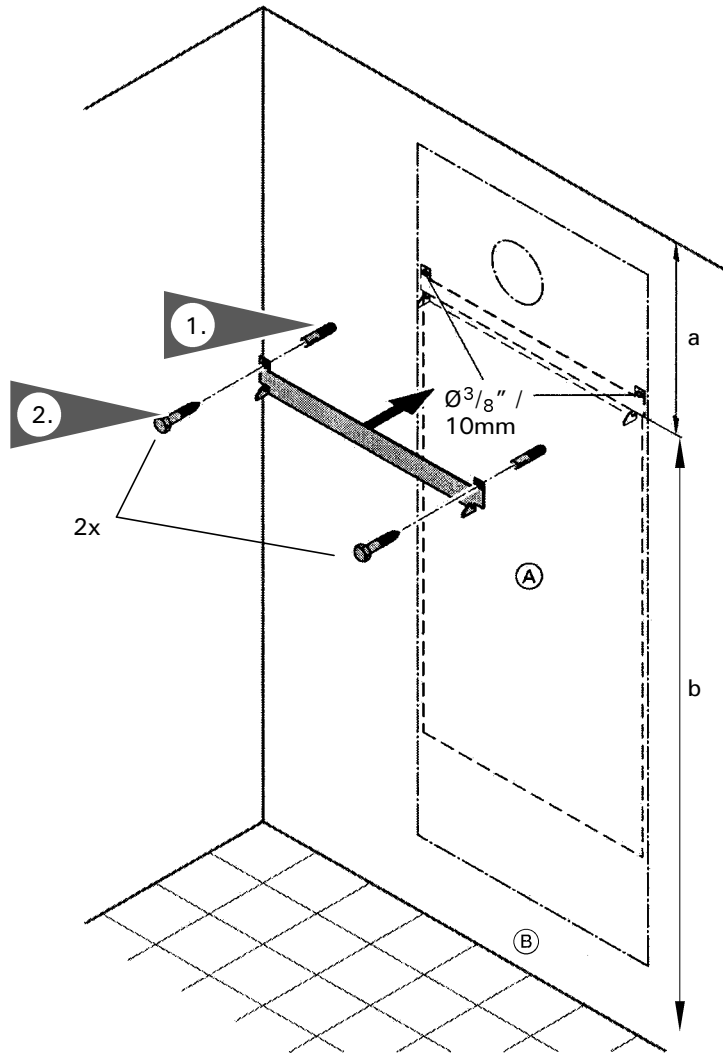


BWR	Boiler water return, ¾"
BWS	Boiler water supply, ¾"
BD	Boiler drain
BF	Boiler fill
GC	Gas connection, ¾" NPTM (male thread)
PRV	Pressure relief valve
PG	Pressure gage
VC	Venting connection



## Wall Mounting

### Wall mounting bracket installation



#### Legend

- Ⓐ Mounting template
- Ⓑ Finished floor level

#### Dimensions

- a 12" / 300mm
- b min. 45" / 1143mm

The Vitodens 100-W can be wall-mounted on

- a brick/concrete wall
- wood studs
- metal studs

Following are the installation instructions for the mounting bracket on each material. Skip to the installation instructions applicable to your installation requirements.

#### **CAUTION**

Whichever mounting method is used, ensure that the bracket is tightly and securely fastened to wall. Failure to secure boiler properly could cause boiler to loosen, posing a severe safety hazard.

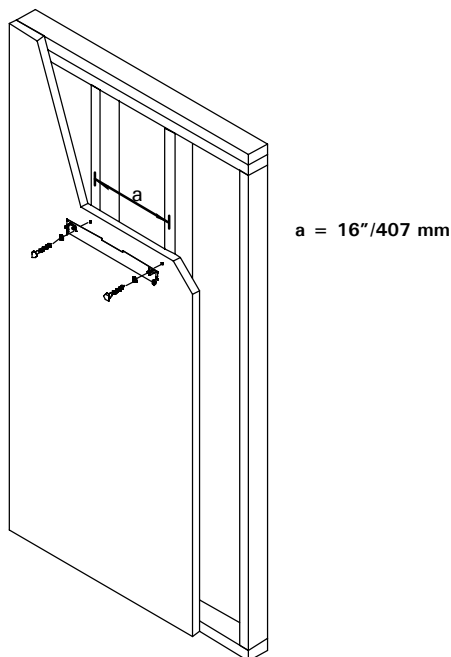
#### Installation of mounting bracket on brick/concrete wall:

1. Drill holes (Ø 3/8" / 10 mm), using mounting template supplied with the boiler.
2. Align wall mounting bracket and attach to wall with the screws and plastic anchors supplied.

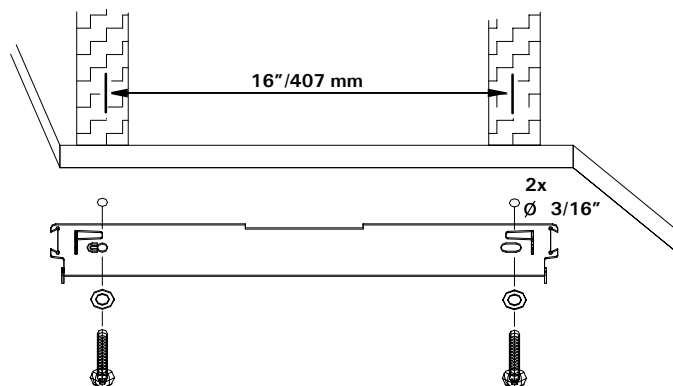


## Wall Mounting *(continued)*

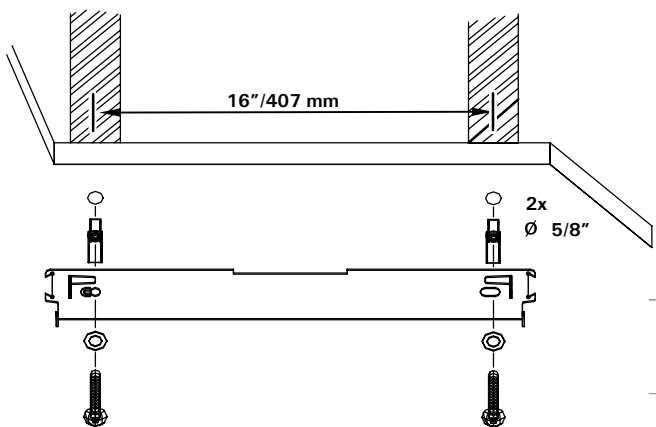
### Mounting bracket installation *(continued)*



Installation of mounting bracket



Installation of mounting bracket on wood studs



Installation of mounting bracket on metal studs

### Installation of mounting bracket on wood and metal studs

To mount the Vitodens 100-W boiler on wood or metal studs, install mounting bracket on wall as shown on previous page.

Refer to drawings on the left and below for more detailed installation information.

Install mounting bracket on wood studs as per illustration.

Drill  $\frac{3}{16}''$  pilot holes to insert mounting bolts.

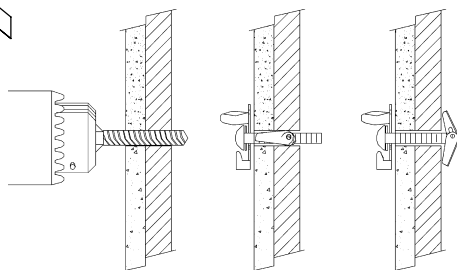
Ensure that holes are located in the center of each wood stud.

Install mounting bracket on metal studs as per illustration.

Drill  $\frac{5}{8}''$  pilot holes to insert mounting bolts.

Ensure that holes are located in the center of each metal stud.

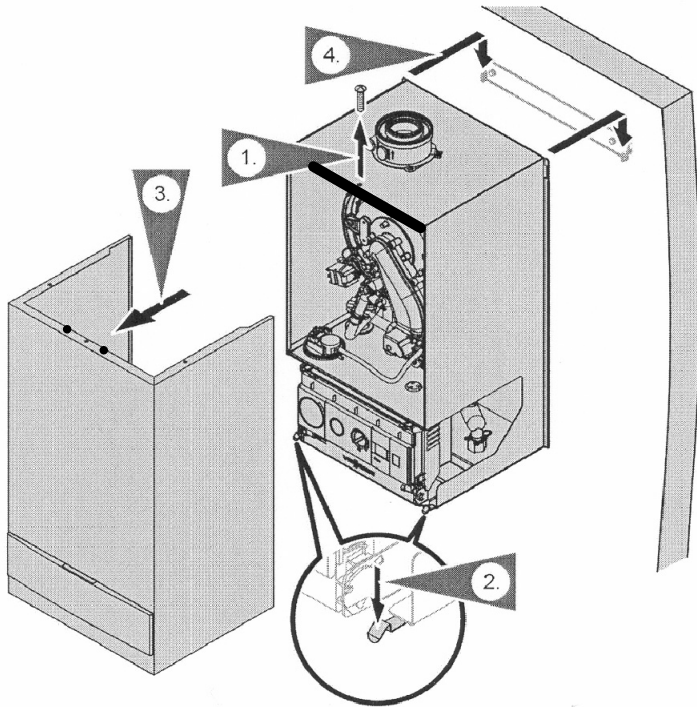
Secure mounting bracket with bolts to metal studs as shown.



## Boiler Connections

### Wall Mounting *(continued)*

#### Mounting Vitodens 100-W boiler



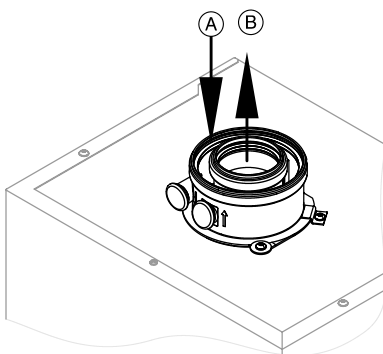
1. Remove the screw at the top of boiler.
2. Press down on springs at bottom of boiler and remove the front enclosure panel.
3. Remove front enclosure panel.
4. Mount boiler onto the mounting bracket.



*For installation of the mounting bracket, see subsection entitled "Wall mounting bracket installation" on page 16 of this manual.*

## Connections

#### Flue gas connection



- Ⓐ Combustion air
- Ⓑ Flue gases

The Vitodens 100-W boiler comes with a preinstalled vent pipe adaptor (as shown).

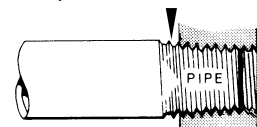
Run venting system, single-pipe, double-pipe or coaxial, through the side wall or the roof, taking the shortest possible route and at a rising angle (min. 3°).



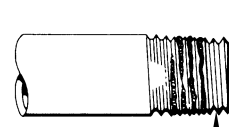
*Read and follow the Installation Instructions Vitodens Venting System for details.*

2 imperfect threads

Use moderate amount of dope



Thread pipe right length



Leave 2 end threads bare

Support piping by proper suspension method. Piping must not rest on or be supported by boiler.

[illegible]

- 1. Make gas connection in accordance with codes CAN/CSA B149.1 or National Fuel Gas Code ANSI Z223.1/NFPA 54, as well as local codes where applicable.**
- 2. Close gas shutoff valve on boiler.**
- 3. Perform leak test.**
- 4. Bleed air from gas supply pipe.**

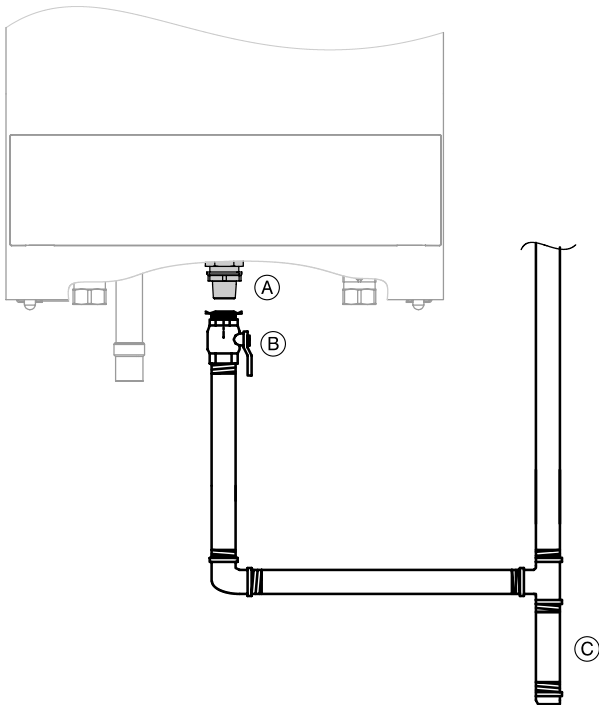
See following page for details on gas connection and piping.

### Legend

- (A) Water supply connection  
 (B) Condensate drain connection  
 (C) Gas connection  
 (D) Water return connection

## Connections *(continued)*

### Gas connection and piping *(continued)*



#### Legend

- (A) Gas connection
- (B) Accessible manual gas shutoff (factory supplied)
- (C) Drip leg

### IMPORTANT

Max. gas supply pressure: 14 "w.c.



#### WARNING

The gas supply piping must be leak tested before placing the boiler in operation.



#### CAUTION

Ensure that gas piping is large enough for all appliances in the residence. No noticeable gas pressure drop in the gas line must occur when any unit (or combination of units) lights or runs.

1. Refer to current CAN/CSA B149.1 or National Fuel Gas Code ANSI Z223.1/NFPA 54, as well as local codes for gas piping requirements and sizing. Pipe size to the boiler must be determined based on:
  - pipe length
  - number of fittings
  - maximum input requirements of all gas appliances in the residence.

### IMPORTANT

Design piping layout in such a way that piping does not interfere with serviceable components.

2. Before connecting boiler to gas line, install ground joint union, capped drip leg and a manual equipment shutoff valve. Valves must be listed by a nationally recognized testing agency. Make boiler gas connection as shown on the left.

Gas connection (NPT) ..... Ø ¾"

3. Perform gas piping pressure test as described in the following subsection.
4. Identify shutoff valves as such with a tab and familiarize operator/ultimate owner of boiler with these valves.

**Connections** *(continued)***Gas piping pressure test**

When performing the gas piping pressure test, ensure the following requirements are met.

**WARNING**

Never check for gas leaks with an open flame.

**WARNING**

Exposing boiler gas pressure regulator and gas valve to extreme pressures renders warranty null and void.

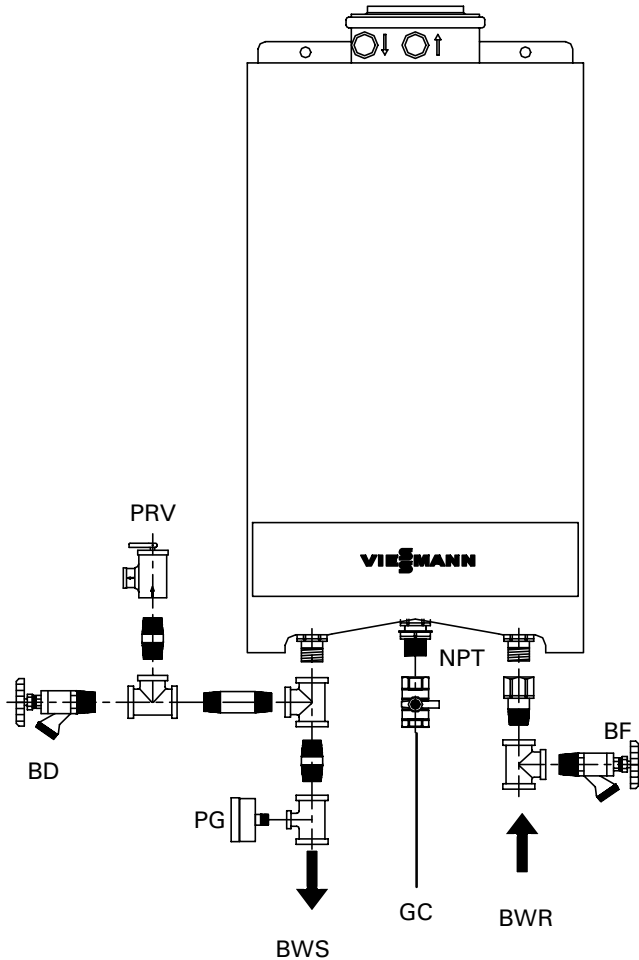
**IMPORTANT**

$\frac{1}{2}$  psig = 14 "w.c.

1. Isolate the boiler from the gas supply piping system using the individual manual shutoff valve during pressure tests equal to or less than  $\frac{1}{2}$  psig/ 14 "w.c.
2. The boiler and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of  $\frac{1}{2}$  psig/14 "w.c.
3. Perform leak test.  
Use approved liquid spray solution for bubble test. Ensure that no liquid is sprayed on any electrical components, wires or connectors. Do **not** allow leak detection fluid to contact gas valve regulator or regulator vent opening.
4. Correct any and all deficiencies.
5. Remove air from gas line.

## Connections *(continued)*

### Heating water connections



#### Legend

BWR Boiler water return, 3/4"  
 BWS Boiler water supply, 3/4"  
 BD Boiler drain  
 BF Boiler fill  
 GC Gas connection, 3/4" NPTM  
 PRV Pressure relief valve  
 NPT National Pipe Thread  
 PG Pressure gauge

1. Thoroughly flush heating system (particularly before connecting the boiler to an existing system).
2. Connect boiler to the heating system.

Max. operating pressure ..... 3 bar/  
 ..... 45 psig  
 Test pressure ..... 4 bar/  
 ..... 60 psig

#### IMPORTANT

**Damage resulting from pressure exceeding those values stated is not covered by Viessmann warranty.**

- Use a two-hand wrench method when tightening fittings or piping onto the boiler connectors. Use one wrench to prevent the boiler pipes from twisting and the second wrench to tighten the fitting or piping. Failure to support the boiler connection could damage the boiler and its internal piping.
- All plumbing must meet or exceed all local state and national plumbing codes.

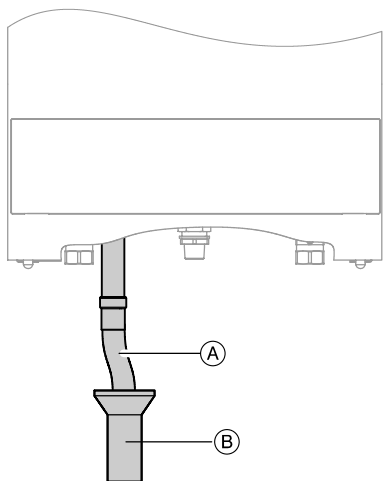
#### IMPORTANT

**SUPPORT ALL PIPING USING HANGERS. DO NOT support piping by the unit or its components.**

- Use isolation valves to isolate system components.

## Connections *(continued)*

### Condensate connection



- (A) Flexible discharge tubing  
(B) Discharge tubing

The Vitodens 100-W boiler comes with a built-in condensate trap. An external trap is not required when connecting the field drain to flexible discharge tubing. Discharge tubing (field supplied) must be of 1" diameter. Use CPVC, PVC or other material approved by codes listed below.

In the U.S. the drain pipe and fittings must conform to ANSI standards and ASTM D1785 or D2846. CPVC or PVC cement and primer must conform to ASTM D2564 or F493. In Canada use CSA or ULC listed schedule 40 CPVC or PVC drain pipe, fittings and cement. If the condensate outlet of the Vitodens 100-W boiler is lower than the drain, a condensate pump must be installed. Select a pump which is approved for condensing boiler applications. To avoid condensate spillage, select a pump with an overflow switch. The drain connection must terminate into an open or vented drain as close to the boiler as possible to prevent siphoning of the boiler drain.

1. Install the condensate drain pipe with a suitable gradient.
2. Discharge condensate from the boiler into the drainage system, either directly or (if required) via a neutralization unit (accessory).



*Installation Instructions of Neutralization Unit (if applicable)*

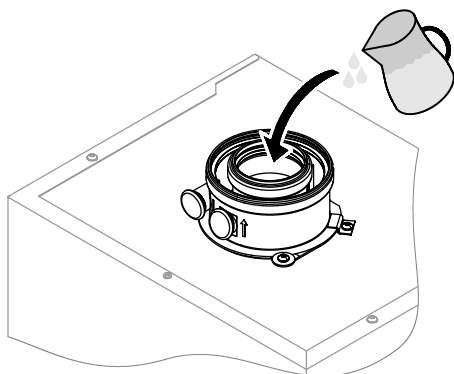
### IMPORTANT

Pipe ventilation must take place between the siphon trap and the neutralization unit (if applicable).

### IMPORTANT

Do not connect the drain pipe from any other appliance, such as water softener backwash pipe, to Vitodens condensate drain pipe.

### Fill Siphon with water



Fill a minimum of 10 fl.oz. / 0.3 liters of water into the boiler adaptor.

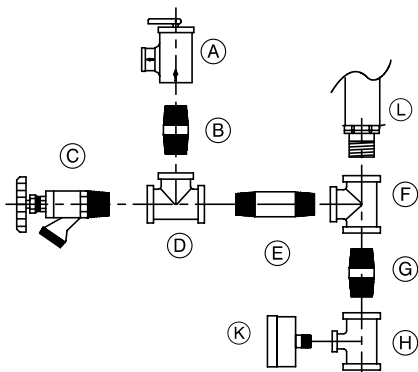


### WARNING

At initial start-up, flue gases may be emitted from the condensate drain. Fill the siphon with water before start-up.

## Safety Connections and Pressure Testing

### Installing safety devices on the boiler



#### Legend

- (A) Pressure relief valve (30 psig), 3/4" NPT
- (B) Brass nipple, length 2" x 3/4"
- (C) Drain valve connection, 3/4"
- (D) Tee, 3/4" x 3/4" x 3/4"
- (E) Brass nipple, length 3" x 3/4"
- (F) Reducing tee, 3/4" x 3/4" x 3/4"
- (G) Brass nipple, length 2" x 3/4"
- (H) Tee, 1/4" x 3/4" x 3/4"
- (K) Pressure gage, 1/4"
- (L) Boiler supply connection

1. Remove loosely preassembled combination pressure relief valve and drain valve assembly.

2. Apply sufficient amount of pipe sealant to both ends of all pipe fittings (B), (C), (E) and (G), and install onto tees (D), (F) and (H).

3. Install pressure relief valve (A) and tighten.

4. Install discharge pipe on pressure relief valve in such a way that...

- the end of the pipe is not threaded.
- the pressure relief discharge pipe extends to a floor drain and ends approximately 6"/150 mm above the drain.

Ensure that...

- there is no shutoff valve installed in the discharge pipe.
- discharge pipe diameter is not reduced.
- discharge is not piped to outdoors.

Minimum connection diameters:

Pressure relief valve .....	3/4"
Discharge pipe .....	3/4"
Piping to precharged expansion tank .....	3/4"

#### IMPORTANT

Install the (approved) factory supplied pressure relief valve.

Removal of air from the system must occur via use of air vent(s) in the system supply. To ensure the boiler can be purged of all air, ensure supply/return water lines do not contain restrictive piping where air could be trapped.



#### WARNING

Do not install an isolation valve between boiler and pressure relief valve.

The discharge pipe for the pressure relief valve must be oriented to prevent scalding of attendants.

Pipe pressure relief valve discharge pipe close to floor drain. Never pipe discharge pipe to the outdoors.

#### Low water cut-off

A low water cut-off may be required by local codes. If boiler is installed above radiation level, a low water cut-off device of approved type (field supplied) must be installed in all instances. Do not install an isolation valve between boiler and low water cut-off (see subsection entitled "Boiler with low water cut-off" on page 36 in these instructions).



## Safety Connections and Pressure Testing *(continued)*

### Performing pressure test on the boiler

The boiler must be leak tested before being placed in operation. Before boiler is connected to piping or electrical power supply, it must be hydrostatically pressure tested.

1. Cap supply and return connections ( $\frac{3}{4}$ " NPT Male).
2. Connect  $\frac{1}{2}$ " garden hose to boiler drain valve at the bottom of the boiler and fill boiler slowly until pressure gage indicates max. 4 bar/60 psig.
3. Maintain pressure for 15 minutes. During time of pressure testing, do not leave boiler unattended.
4. Inspect all pipe joint connections and safety devices with a flashlight for leaks.  
A lower manometer reading than 4 bar/60 psig usually indicates loss of water due to leakage. All leaks must be repaired.

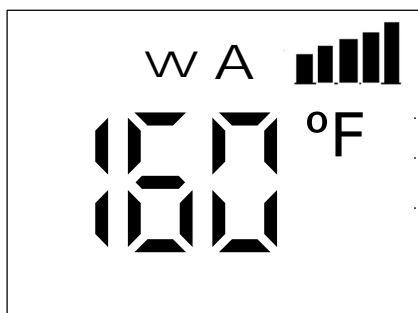
5. After 15 minutes, release water pressure from boiler by opening boiler drain valve slowly, remove caps from supply and return connections as well as  $\frac{3}{4}$ " cap from 2" nipple, and install pressure relief valve immediately instead of  $\frac{3}{4}$ " cap.

After boiler has passed pressure test, proceed with the installation.

### **WARNING**

Exposing the boiler to pressures and temperatures in excess of those listed will result in damages, and will render warranty null and void.

### Hot water temperature and system pressure



#### Hot water temperature reading

The hot water reading is constantly displayed during operation.



#### Pressure reading

1. Turn the knob „tr “ to the left on „9“. The display will show the actual system pressure (e.g. 20 psig).
2. Turn the knob back to the original position.

#### **Note:**

When the system pressure falls below 8 psig, it will be indicated by a flashing display. If this happens, contact your heating contractor.

### Installation Examples

#### General

The schematics on the following pages are to be seen as guidelines only. They further do not display all system varieties, safety devices, or concepts possible. Specific system layouts may be further discussed with the local Viessmann sales representative office.

#### Clearances

A minimum of 2"/51 mm circumferential clearance from non-insulated hot water pipes to combustible construction must be maintained. In cases where the pipes are insulated with pipe insulation of appropriate and sufficient thickness and insulation values, the above clearance may be reduced to 0" (refer to local gas codes).

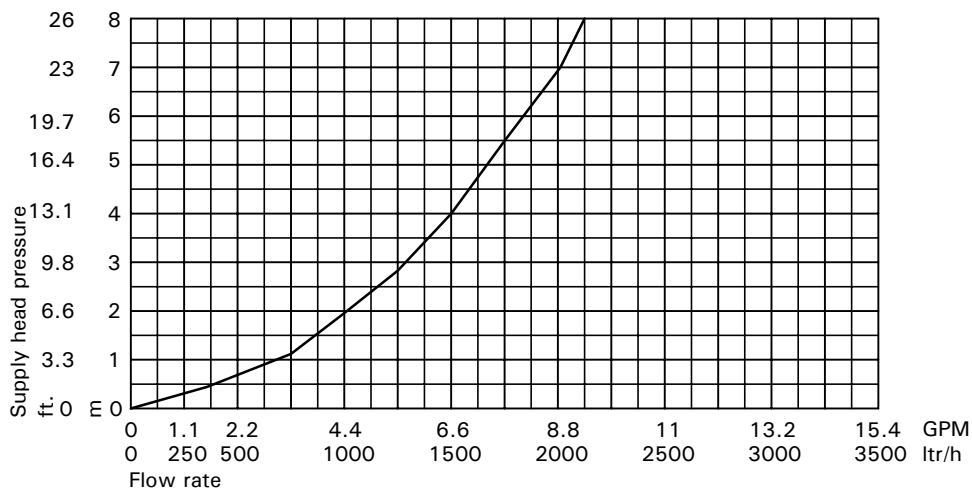


#### CAUTION

For underfloor heating applications, an additional immersion or strap-on aquastat must be installed in the low temperature underfloor loop (downstream of the mixing valve) to de-energize the pump and/or boiler to prevent overheating. High water temperatures can damage concrete slabs.

## Installation Examples *(continued)*

Pressure drop (primary circuit) of Vitodens 100-W



Pressure drop for model WB1A 8-24, 8-30

### Typical System Flow Rates

Model	WB1A	8-24	8-30
$\Delta t$ for NG			
Output (NG) Btu/h		72 000	90 000
20 °F rise (GPM)		7.2	9.0
25 °F rise (GPM)		5.8	7.2
30 °F rise (GPM)		4.8	6.0
35 °F rise (GPM)		4.1	5.1
40 °F rise (GPM)		3.6	4.5

A low-loss header **must** be used when the **system** flow rate exceeds the maximum (or minimum) flow rate of the Vitodens 100-W boiler. An alternative method may be used, such as primary secondary piping using closely spaced tees.

A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees.

*Use standard friction loss method for pipe sizing.*

*Observe boiler maximum and minimum flow rate limitations. If system flow rate exceeds boiler maximum flow rate (as stated on page 68) or if system flow rate is unknown, Viessmann strongly recommends the installation of a low-loss header. See page 36 for low-loss header information or refer to the Vitodens Venting System Installation Instructions.*

### Important!

The following examples depict possible piping layouts of the Vitodens 100-W boiler equipped with Viessmann System Technology.

Please note that the examples below are simplified conceptual drawings only!

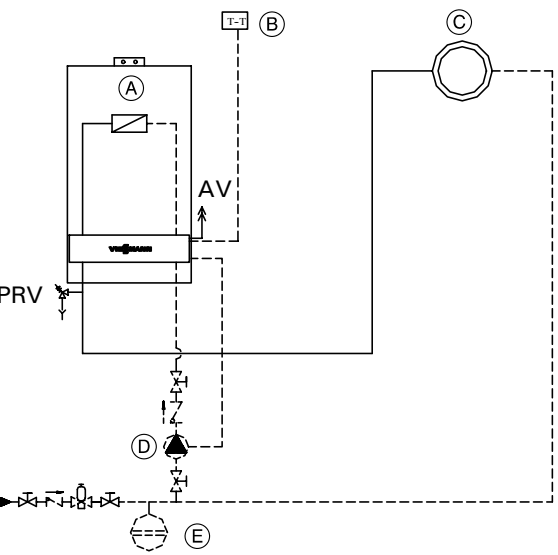
Piping and necessary componentry must be field verified.

A low water cut-off (LWCO) must be installed where required by local codes.

Proper installation and functionality in the field is the responsibility of the heating contractor.

Installation Examples *(continued)*

**System Layout 1**  
Vitodens 100-W, WB1A 8-24, 8-30 with...  
– one heating circuit



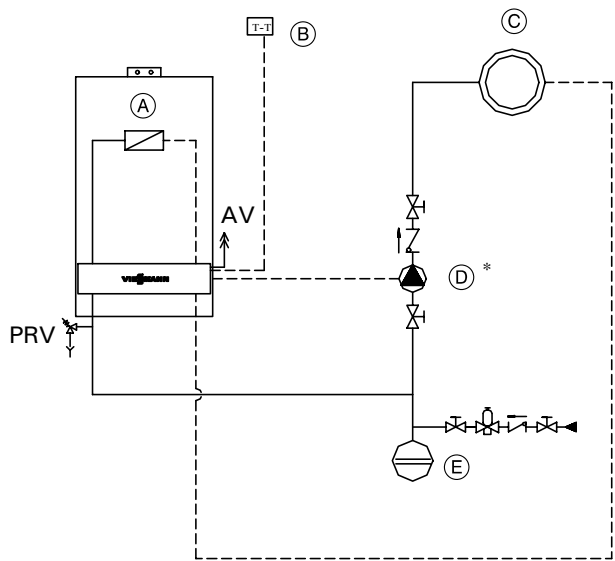
- Legend**
- AV Air vent  
PRV Pressure relief valve

- Ⓐ Vitodens 100-W
- Ⓑ Room thermostat
- Ⓒ Heating circuit
- Ⓓ Heating circuit pump (field supplied)
- Ⓔ Expansion tank

**\* IMPORTANT**

Ensure that a pressure activated by-pass is installed. Refer to the table for the DIP switch setting on page 38.

**System Layout 1 - Alternate Option**



Please note!  
The use of a low-loss header is recommended if the water flow rate is less than 1.7 GPM / 400 ltr/h or more than 6.2 GPM / 1400 ltr/h.  
The low-loss header is available as accessory part.

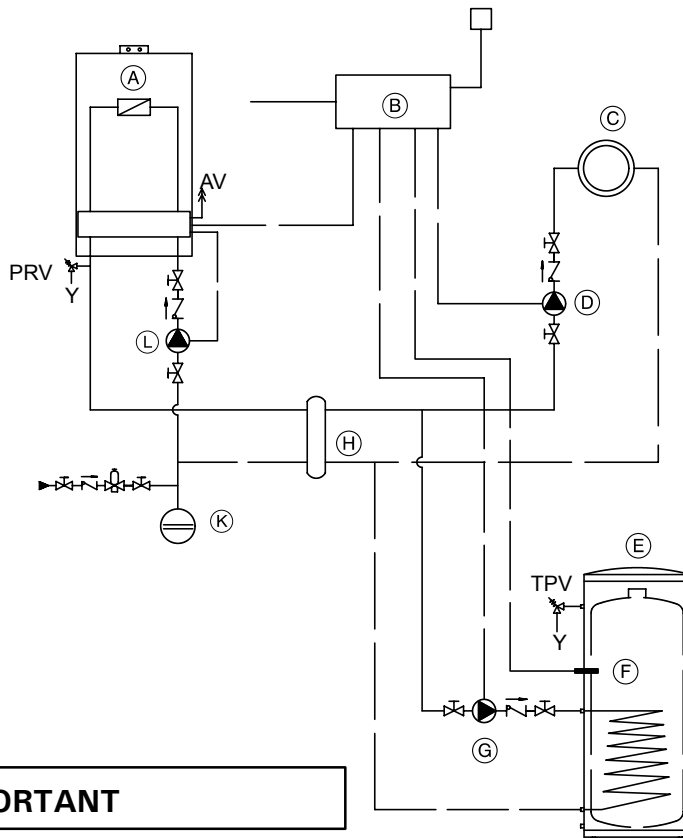
Model No.	Max. flow rate (GPM/ltr/h)
Vitodens 100, WB1A 8-24	6.2/1400
WB1A 8-30	6.2/1400

## Installation Examples *(continued)*

### System Layout 2

Vitodens 100-W, WB1A 8-24, 8-30 with...

- DHW storage tank
- low-loss header
- one heating circuit



- AV Air vent  
 PRV Pressure relief valve  
 TPV Temperature and pressure relief valve
- (A) Vitodens 100-W gas-fired condensing boiler  
 (B) External boiler/DHW controller (field supplied)  
 (C) Heating circuit  
 (D) Heating circuit pump (field supplied)  
 (E) DHW storage tank  
 (F) DHW tank temperature aquastat or sensor  
 (G) DHW circulating pump (field supplied)  
 (H) Low-loss header  
 (K) Expansion tank  
 (L) Primary pump (boiler circuit, field supplied) *with low-loss header only*

### IMPORTANT

Primary pump (L) must pump into the boiler (as illustrated).

Please note!

The use of a low-loss header is recommended if the water flow rate is **less** than 1.7 GPM / 400 ltr/h or **more** than 6.2 GPM / 1400 ltr/h.

The low-loss header is available as accessory part.

See page 36 in this manual for details on the low-loss header.

Model No.	Max. flow rate (GPM/ltr/h)
Vitodens 100-W,	
WB1A 8-24	6.2/1400
WB1A 8-30	6.2/1400

### IMPORTANT

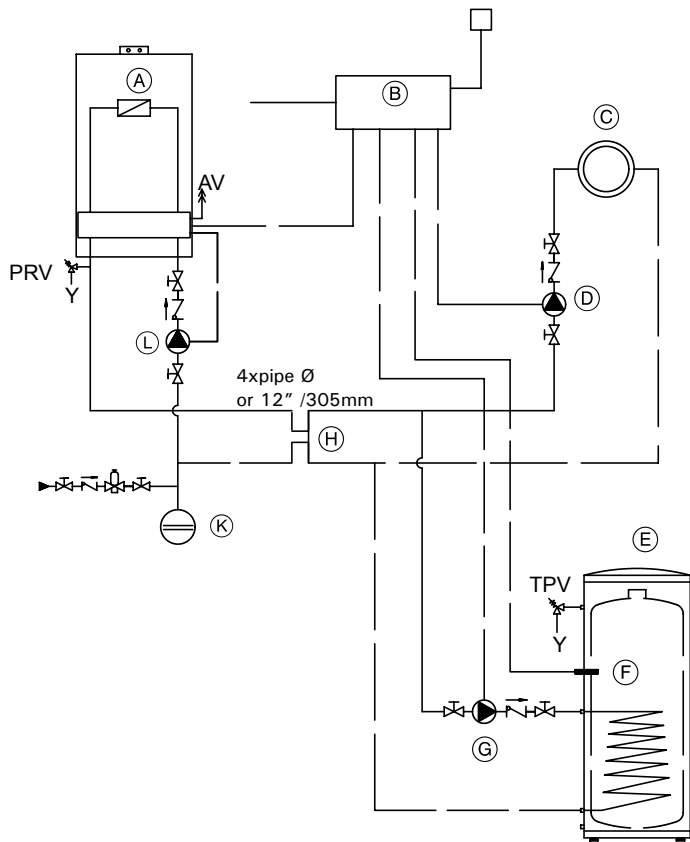
DHW supply and return piping between boiler DHW connections and the Viessmann DHW tank connections, shall be a minimum of 1" nominal pipe diameter (irrespective of the 3/4" DHW connection outlet sizes provided on the boiler and the DHW tank). This will ensure pump head is fully utilized to overcome the resistance of the DHW heat exchanger coil and to provide sufficient water flow to the boiler heat exchanger.

In non-Viessmann DHW tank applications, perform, in addition to the above, accurate calculations for DHW tank coil pressure drop versus boiler pump head to ensure sufficient water flow to the boiler heat exchanger. Failure to heed the above instructions may cause boiler short-cycling and inadequate DHW supply.

Installation Examples (continued)

**System Layout 3**  
Vitodens 100-W, WB1A 8-24, 8-30 with...

- DHW storage tank
- one heating circuit



AV Air vent  
PRV Pressure relief valve  
TPV Temperature and pressure relief valve

- (A) Vitodens 100-W gas-fired condensing boiler
- (B) External boiler/DHW controller (field supplied)
- (C) Heating circuit
- (D) Heating circuit pump (field supplied)
- (E) DHW storage tank
- (F) DHW tank temperature aquastat or sensor
- (G) DHW circulating pump (field supplied)
- (H) Closely spaced tees, 4xpipe Ø or 12" /305mm\*
- (K) Expansion tank
- (L) Primary pump (boiler circuit, field supplied)

\* A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees.

Please see page 36 for details.

**IMPORTANT**

Primary pump (L) must pump into the boiler (as illustrated).

Please note!  
The use of a low-loss header is recommended if the water flow rate is **less** than 1.7 GPM / 400 ltr/h or **more** than 6.2 GPM / 1400 ltr/h. The low-loss header is available as accessory part. See page 36 in this manual for details on the low-loss header.

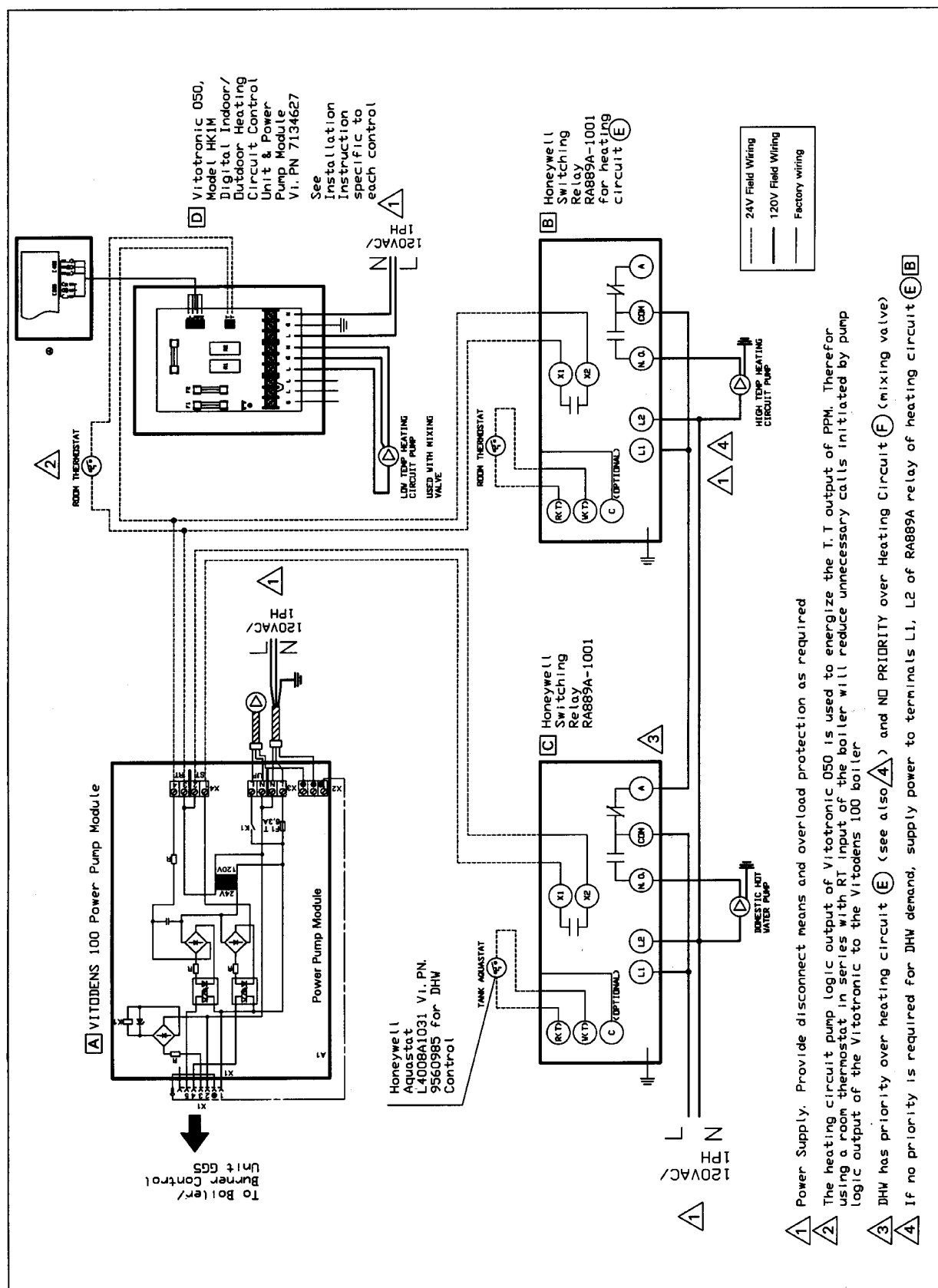
Model No.	Max. flow rate (GPM/ltr/h)
Vitodens 100-W,	
WB1A 8-24	6.2/1400
WB1A 8-30	6.2/1400

**IMPORTANT**

DHW supply and return piping between boiler DHW connections and the Viessmann DHW tank connections, shall be a minimum of 1" nominal pipe diameter (irrespective of the ¾" DHW connection outlet sizes provided on the boiler and the DHW tank). This will ensure pump head is fully utilized to overcome the resistance of the DHW heat exchanger coil and to provide sufficient water flow to the boiler heat exchanger. In non-Viessmann DHW tank applications, perform, in addition to the above, accurate calculations for DHW tank coil pressure drop versus boiler pump head to ensure sufficient water flow to the boiler heat exchanger. Failure to heed the above instructions may cause boiler short-cycling and inadequate DHW supply.

# Installation Examples *(continued)*

## Wiring diagram for system layout 4

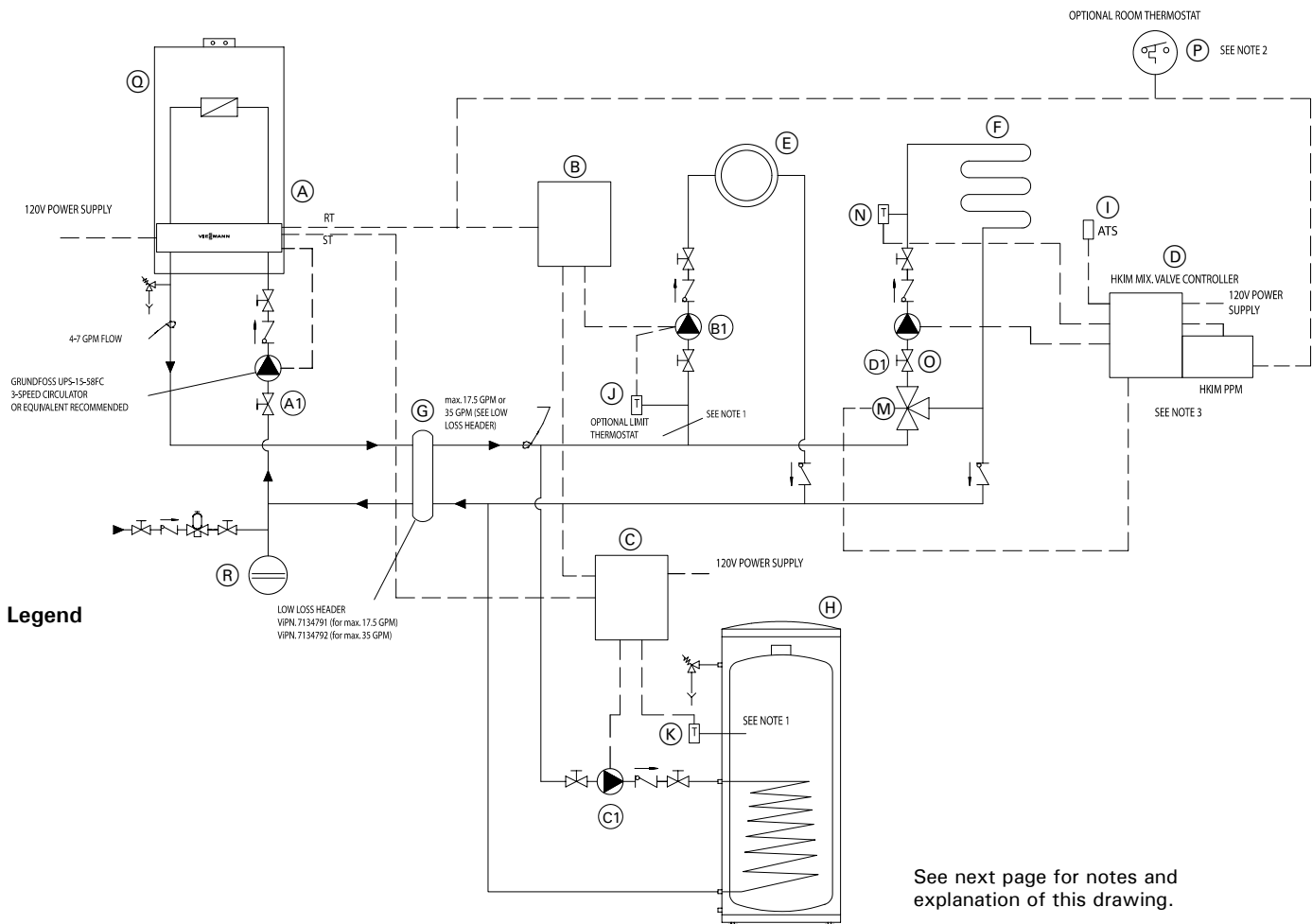


## Installation Examples *(continued)*

### System Layout 4

Vitodens 100-W, WB1A 8-24, 8-30 with...

- DHW storage tank
- Low-loss header
- one high-temperature heating circuit
- one low-temperature heating circuit
- Viessmann Vitotronic 050, HK1M controller



### Legend

### Legend

- |   |   |   |
|---|---|---|
| (A) Boiler power pump module  | (D1) Heating circuit pump (field supplied)  | (K) DHW tank aquastat, Honeywell Part No. L4008A1031, Vi. Part No. 9560 985 |
| (A1) Primary pump (boiler PPM control) (field supplied)   | (E) Radiator heating circuit  | (M) Mixing valve motor / control  |
| (B) Honeywell switching relay for heating circuit (E)   | (F) Underfloor heating circuit  | (N) Mixing valve supply temperature sensor                                  |
| (B1) Heating circuit pump (field supplied)  | (G) Low loss header<br>-Max. flow 17.5 USGPM<br>Vi. Part No. 7134 791<br>-Max. flow 35 USGPM<br>Vi. Part No. 7134 792 | (O) Viessmann mixing valve  |
| (C) Honeywell switching relay for DHW (H) control   | (H) DHW indirect storage tank   | (P) Room thermostat (optional)<br>See note 2.                               |
| (C1) DHW circulating pump (field supplied)  | (I) Outdoor temperature sensor  | (Q) Vitodens 100 boiler   |
| (D) Vitotronic 050, Model HK1M Digital indoor / outdoor heating circuit control unit & pump control Vi. Part No. 7134 627 | (J) Limit thermostat (optional)<br>See note 1   | (R) Expansion tank  |

See next page for notes and explanation of this drawing.



## Installation Examples *(continued)*

Installation of heating circuits:

- radiator heating circuit (high temperature circuit)
- underfloor heating circuit with 3-way mixing valve (low temperature circuit)
- DHW production with the following flow conditions:

The flow rate of the heating circuits is greater than the maximum possible water flow rate of the Vitodens 100 boiler.

The use of a low-loss header is therefore recommended.

A low-loss header is available as an accessory part.

The radiator heating circuit is supplied by a circulation pump (field supplied).

The underfloor heating circuit is supplied by a circulation pump installed on site which is controlled by the extension kit. The DHW pump is field supplied.

Please note!

The use of a low-loss header is recommended if the water flow rate is **less** than 1.7 GPM / 400 ltr/h or **more** than 6.2 GPM / 1400 ltr/h.

The low-loss header is available as accessory part. See page 36 in this manual for details on the low-loss header.

### Note 1

Optional high limit safety control of heating circuit (E).

(During DHW production with ST terminal activated, the boiler supply temperature will be set automatically to 78°C / 172°F.

The heating system must be protected from excessive temperature if no automatic mixing valves are used or no DHW priority is required.

After the DHW call for heat is satisfied, there is a 80 seconds pump post purge time.

### Note 2

The heating circuit pump logic output of the Vitotronic 050 is used to energize the T.T. output of PPM.

Therefore, using a room thermostat in series with RT input of the boiler will reduce unnecessary calls initiated by pump logic output of the Vitotronic to the Vitodens 100 boiler (mixing valve heating circuit only).

### Note 3

During DHW call for heat, there is no priority on mixing valve heating circuit.

Model No.	Max. flow rate (GPM/ltr/h)
Vitodens 100-W,	
WB1A 8-24	6.2/1400
WB1A 8-30	6.2/1400

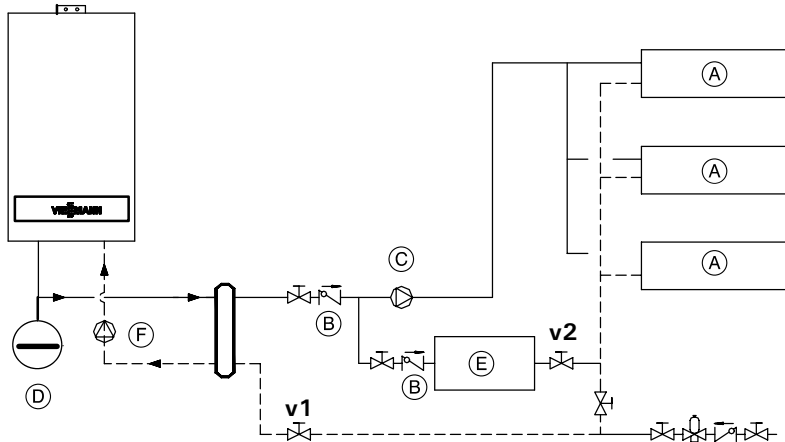
## IMPORTANT

DHW supply and return piping between boiler DHW connections and the Viessmann DHW tank connections, shall be a minimum of 1" nominal pipe diameter (irrespective of the ¾" DHW connection outlet sizes provided on the boiler and the DHW tank). This will ensure pump head is fully utilized to overcome the resistance of the DHW heat exchanger coil and to provide sufficient water flow to the boiler heat exchanger.

In non-Viessmann DHW tank applications, perform, in addition to the above, accurate calculations for DHW tank coil pressure drop versus boiler pump head to ensure sufficient water flow to the boiler heat exchanger. Failure to heed the above instructions may cause boiler short-cycling and inadequate DHW supply.

### Installation Examples *(continued)*

#### Boiler in heating/cooling application



- Ⓐ Heating/Cooling unit
- Ⓑ Spring-loaded flow check valve
- Ⓒ Circulation pump
- Ⓓ Expansion tank
- Ⓔ Water chiller
- Ⓕ Boiler circuit pump (field supplied)

#### IMPORTANT

Viessmann strongly suggests that the valves pictured above be labelled "v1" and "v2".

The boiler, when used in connection with a refrigeration system, must be installed ensuring the chilled medium is piped in parallel to the boiler with appropriate valves to prevent the chilled medium from entering the boiler. See illustration on the left.

The boiler piping system of a hot water heating boiler connected to heating coils located in air handling units where they may be exposed to refrigerated air circulation must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.

Check installation instructions of the chiller manufacturer carefully for additional requirements.

#### Cooling season starts:

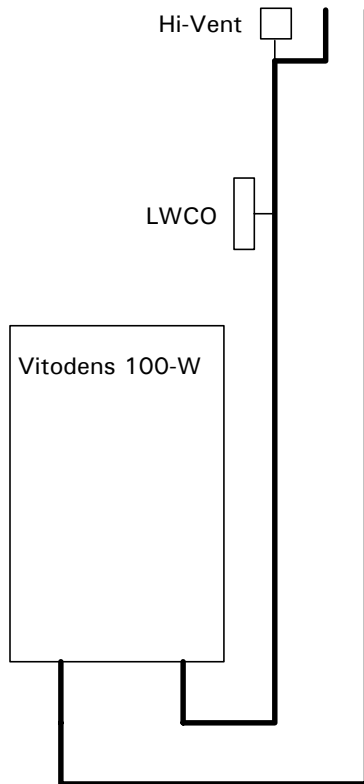
Close valve v1 and open valve v2.

#### Heating season starts:

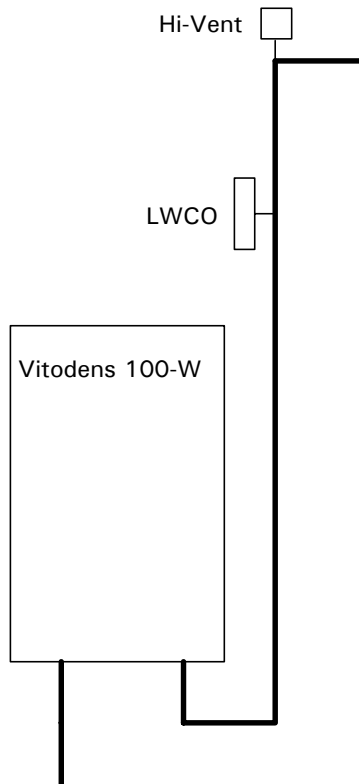
Close valve v2 and open valve v1.

## Installation Examples *(continued)*

### Boiler with low water cut-off (remote-mounted, field supplied)



Boiler below radiation



Boiler above radiation

A low water cut-off may be required by local codes. If boiler is installed above radiation level, a low water cut-off device of approved type (field supplied) must be installed in all instances at the highest point of the piping system. Do **not** install an isolation valve between boiler and low water cut-off.

Follow the installation instructions of the low water cut-off manufacturer.

For low water cut-off wiring information specific to your application, refer to applicable wiring diagram on the boiler enclosure panel.

*Note:*

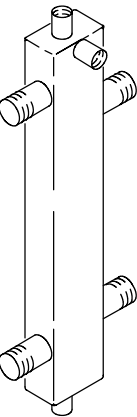
*The Vitodens 100-W boiler has a built-in flow switch, which may be accepted by local codes in lieu of a low water cutoff.*

Installation Examples *(continued)*

Low-loss header (field supplied)

Low-Loss Header

-Type 80/50  
Part No. 7134 230  
(max. flow rate 17.6 GPM / 4 m³/h)  
-Type 120/80  
Part No. 7134 244  
(max. flow rate 35.2 GPM / 8 m³/h)



A low-loss header offers additional benefits not provided by a pair of closely spaced tees. Viessmann strongly recommends and prefers the use of a low-loss header over closely spaced tees.

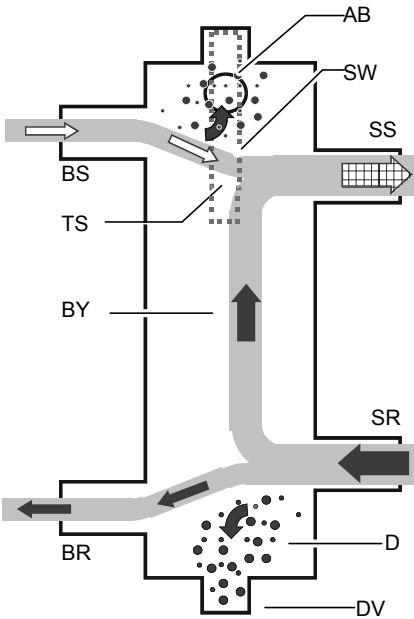
When used in conjunction with the Vitodens 100-W boiler, the low-loss header acts as hydraulic break, decoupling boiler and system circuits from each other (no sensor required).

It is recommended to use the low-loss header in applications in which the total system flow rate exceeds the maximum (or minimum) boiler flow rate.

For maximum boiler flow rates, see table on page 27 in this manual.

Viessmann strongly recommends the use of a low-loss header in cases where the system head and flow rates are unknown. In addition, the low-loss header helps eliminate air and debris from the heating system.

See figures on the right for an illustration of the principle of operation.



Low-loss header design  
(Type 80/50 or 120/80)

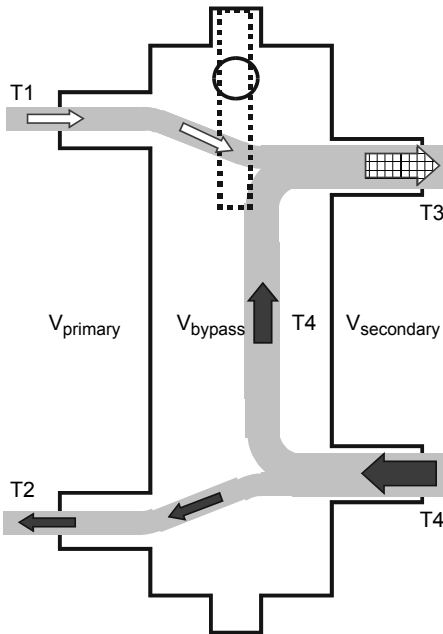
The low-loss header is available in the following sizes. Select the size based on the maximum system flow rate of your application.

Model No.	Max. system flow rate
Type 80/50	17.6 GPM / 4 m³/h
Type 120/80	35.2 GPM / 8 m³/h

*\*1 Product does not look exactly as illustrated.*

Legend

- AB Air Bleed
- BR Boiler Return
- BS Boiler Supply
- BY Bypass (with laminar flow)
- D Debris (or air if LLH is flipped)
- DV Drain Valve
- SR System Return
- SS System Supply
- TS Viessmann Temperature Sensor (not used)
- SW Sensor Well



Principle of Operation

- T1 Boiler supply temperature
- T2 Boiler return temperature
- T3 System supply temperature
- T4 System return temperature
- V<sub>primary</sub> Boiler circuit flow rate
- V<sub>secondary</sub> Heating circuit flow rate
- V<sub>bypass</sub> Bypass flow rate
- Q<sub>primary</sub> Heat supplied by boiler
- Q<sub>secondary</sub> Heat consumed by system

$V_{primary} < V_{secondary}$   
 $T1 > T3$   
 $T2 = T4$   
 $Q_{primary} = Q_{secondary}$   
 $T1 \leq 176^{\circ}\text{F} / 80^{\circ}\text{C}$   
 $V_{secondary} = V_{primary} + V_{bypass}$

IMPORTANT

When installing a low-loss header, system mixed supply temperature (T3) must be calculated as follows:

$$T3 = \frac{T1 \times V_{primary} + T4 \times V_{bypass}}{V_{secondary}}$$

## Venting Connection

For detailed installation information and specific venting requirements, reference the Vitodens Venting System Installation Instructions supplied with the boiler.



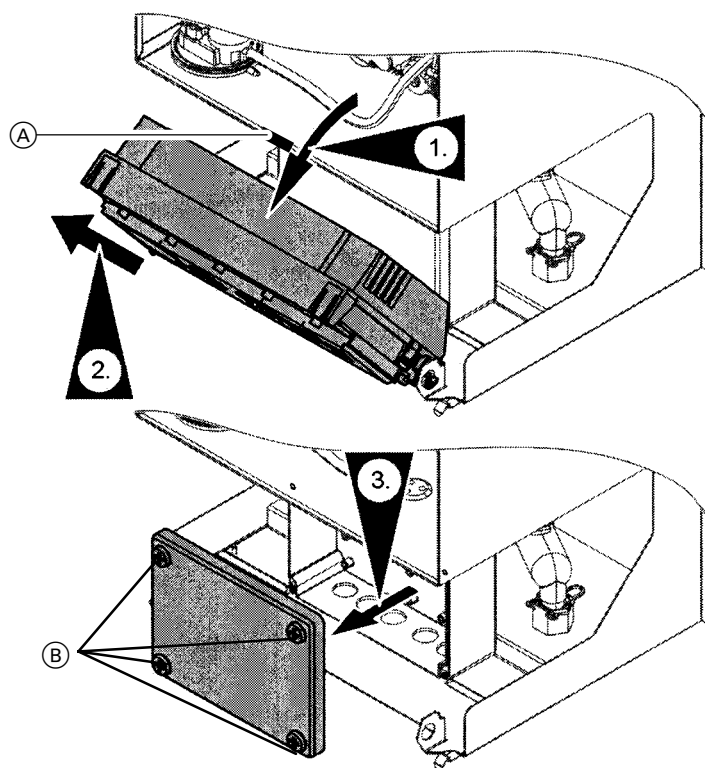
*Installation Instructions  
Vitodens Venting System*

### CAUTION

Under certain climatic conditions some building materials may be affected by flue products expelled in close proximity to unprotected surfaces. Sealing or shielding of the exposed surfaces with a corrosion resistant material (e.g. aluminum sheeting) may be required to prevent staining or deterioration. The protective material should be attached and sealed (if necessary) to the building before attaching the vent termination. It is strongly recommended to install the vent termination on the leeward side of the building.

## Electrical Connections

### Removing the control unit and opening the power pump module



1. Flip control unit down and out towards you. The control unit is held in place with a spring loaded clip (A).
2. Slide unit to the left to remove.
3. Unlock 4 spring loaded lock screws (B) and remove power pump module cover plate.

### IMPORTANT

Both the control unit and the power pump module have labels and stickers containing important information. Read and follow their respective instructions.

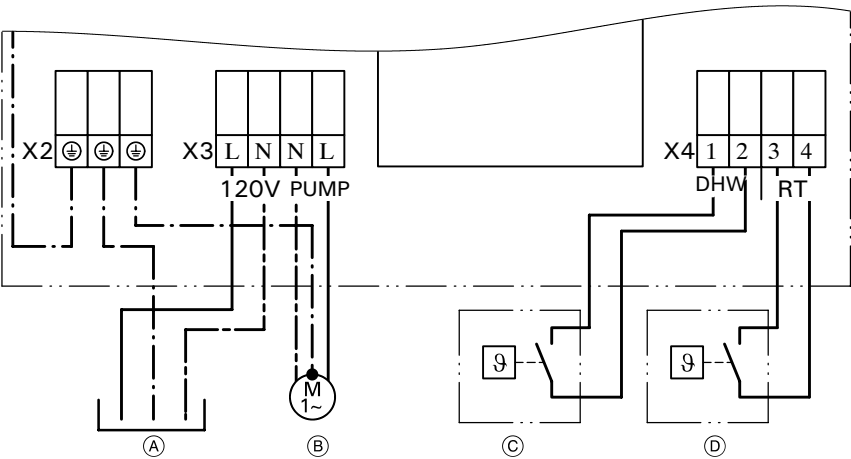
#### Note on connection of accessories



For details regarding other installation steps required, please reference the Installation Instructions supplied with the respective approved accessory part.

Electrical Connections *(continued)*

Electrical connections to the power pump module



*Note:*  
Boilers are factory shipped with a wiring diagram (11"x17" page inside a pouch) attached to the inside of the front cover. The wiring diagram shipped with the boiler supersedes the wiring information in this manual.

Provide main power disconnect/service switch as per local code requirements. Also refer to wiring diagram on page 71.

Legend

- Ⓐ Main power supply (120V, 60Hz, 1 PH).
- Ⓑ Heating circuit pump (or boiler pump with low-loss header application). See DIP switch selection setting S1 below. (Pump runs for 10 seconds every 24 hours).
- Ⓒ DHW tank temperature controller / external heat demand
- Ⓓ Room temperature thermostat (Anticipator setting 0.2A)


IMPORTANT

Remove short factory test leads from terminal L, N and Ground before connecting main power supply to boiler.

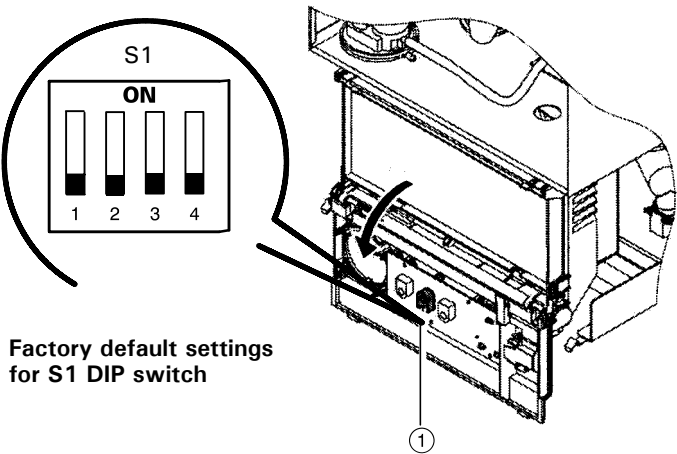
IMPORTANT

Ensure that pressure activated by-pass is installed with system layout 1 on page 28.

*Note:*  
If the boiler is operated using a 10VDC modulating signal...

 See separate OpenTherm (OT) Module Installation Instructions.

DIP switch settings - S1



Factory default settings for S1 DIP switch

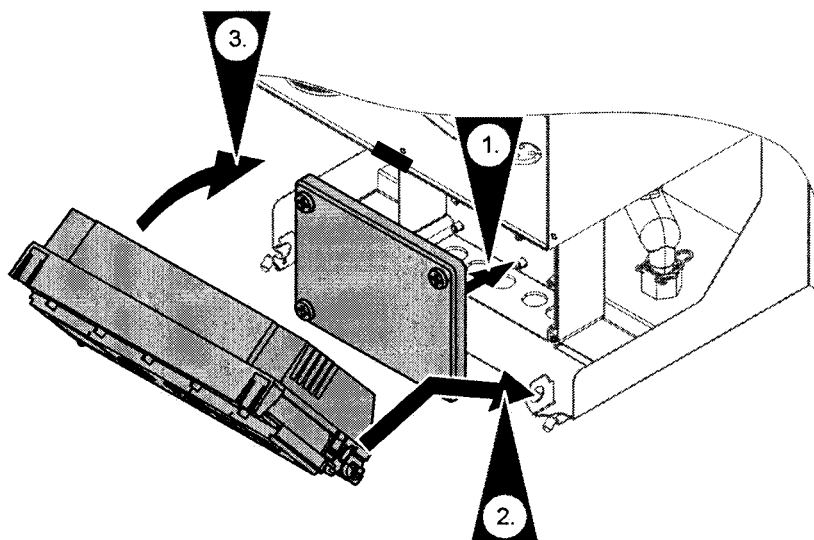
① Dip switch S1

DIP switch settings - S1

Dip switch number	Setting	Explanation
1	OFF	Pump Ⓑ is ON during call for heat. After call for heat (RT-Terminal) is satisfied pump Ⓑ post-purges for 12 mins. After DHW/external heat demand (ST-Terminal) is satisfied, pump Ⓑ post-purges for 1.5 minutes (see important note above).
	ON	Pump Ⓑ operates continuously
2	OFF	Do not adjust
3	OFF	Do not adjust
4	OFF	Do not adjust

## Electrical Connections *(continued)*

### Closing the power pump module and reinstalling the control unit

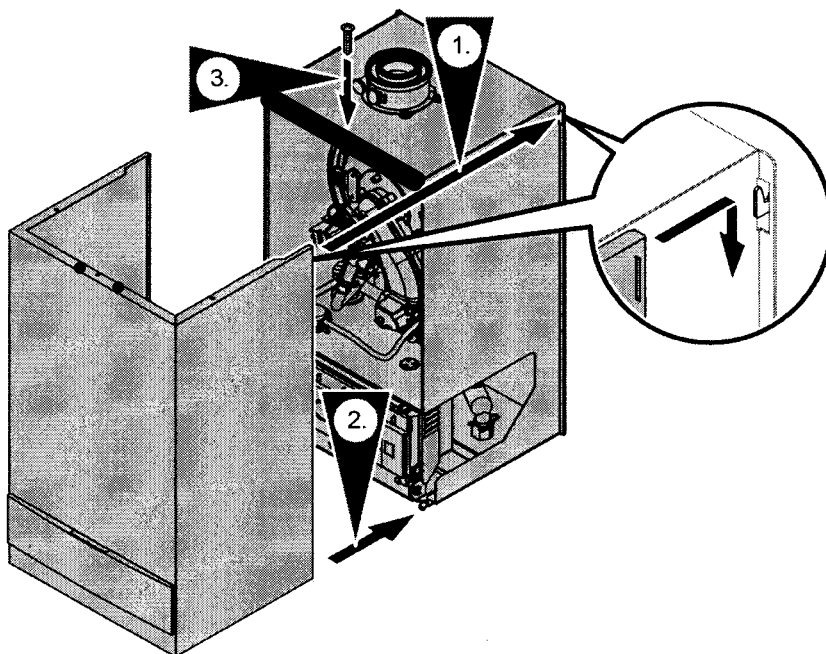


1. Reinstall power pump module cover plate.
2. Hook in control unit.
3. Flip control upward and lock into position.

#### **CAUTION**

Electrical cables may become damaged if in contact with hot components. When running and securing connecting cables on site, ensure that the maximum permissible temperatures of the cables are not exceeded.

### Reinstalling the front cover panel



1. Hook in front cover panel.
2. Press in bottom portion of front cover panel until it locks into position.
3. Screw in screw at top part of boiler.

#### **IMPORTANT**

Read and follow, where applicable, the safety instructions of all labels and stickers attached to boiler surfaces. Do not remove any of these instructions. Contact Viessmann if any replacement labels are required.

## Necessary Tools

### Special items

- Approved leak detection fluid for natural gas
- Pipe joint sealant
- Garden hose for pressure testing

→ *Use only calibrated equipment.*

### Testing/analysis equipment

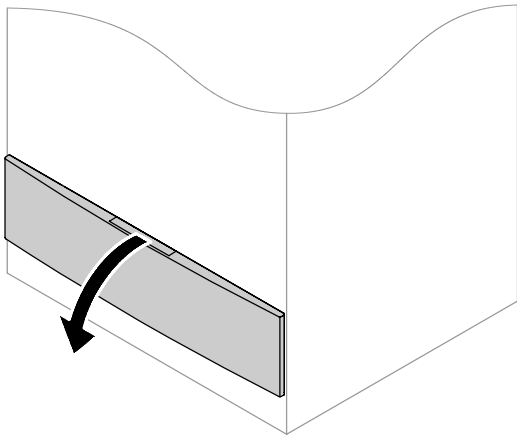
- Multimeter to measure 0 - 12 A AC
- Flue gas analyzer to measure % CO<sub>2</sub> or O<sub>2</sub> (i.e. Bacharach fluid samplers or suitable electronic flue gas analyzer)
- Manometer to measure gas pressure 0 to 11 "w.c. (accurately) and up to 28 "w.c. gas pressure (or a non-electric Magnehelic® manometer may also be utilized)
- Stack thermometer 0 to 500 °F / 0 to 260 °C
- Bacharach calculator or suitable tables to calculate standard (non-condensing) efficiency
- Carbon monoxide measuring equipment 0 to 400 ppm

### Cleaning supplies

- Plastic hand brush
- Rags

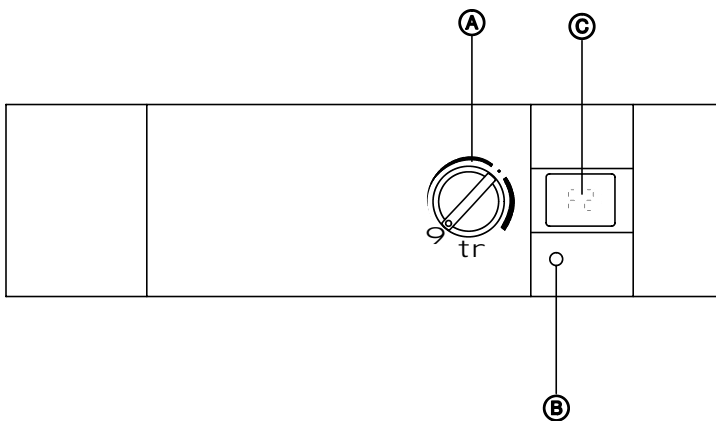


## Overview of Controls and Indicators



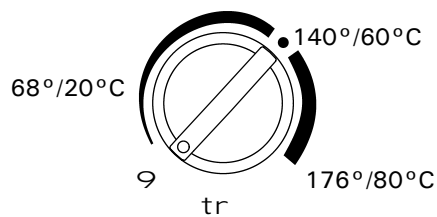
### Opening the control unit

Controls and indicators are located behind the hinged front cover.



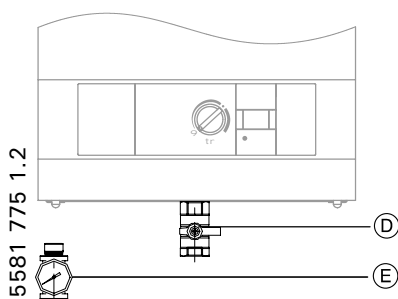
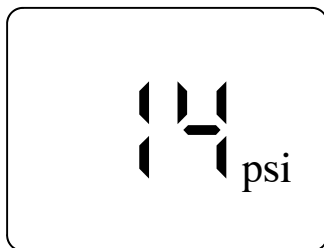
### Control and display elements

The control unit is preset at the factory for standard operation. Your heating system is ready for use. The factory presets may be individually adjusted to suit your specific requirements.

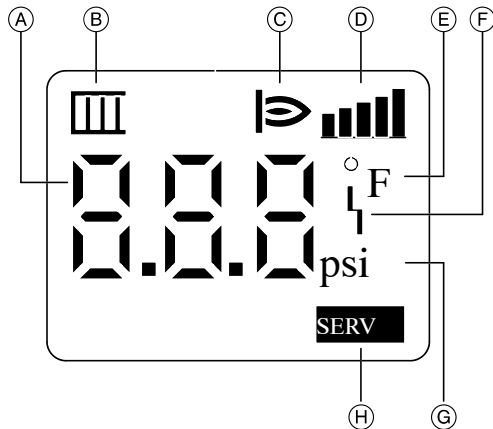


#### Legend

- (A) tr boiler water temperature selector dial
- (B) Display, fault and reset button
- (C) LCD display
- (D) Gas shutoff valve
- (E) Pressure gage



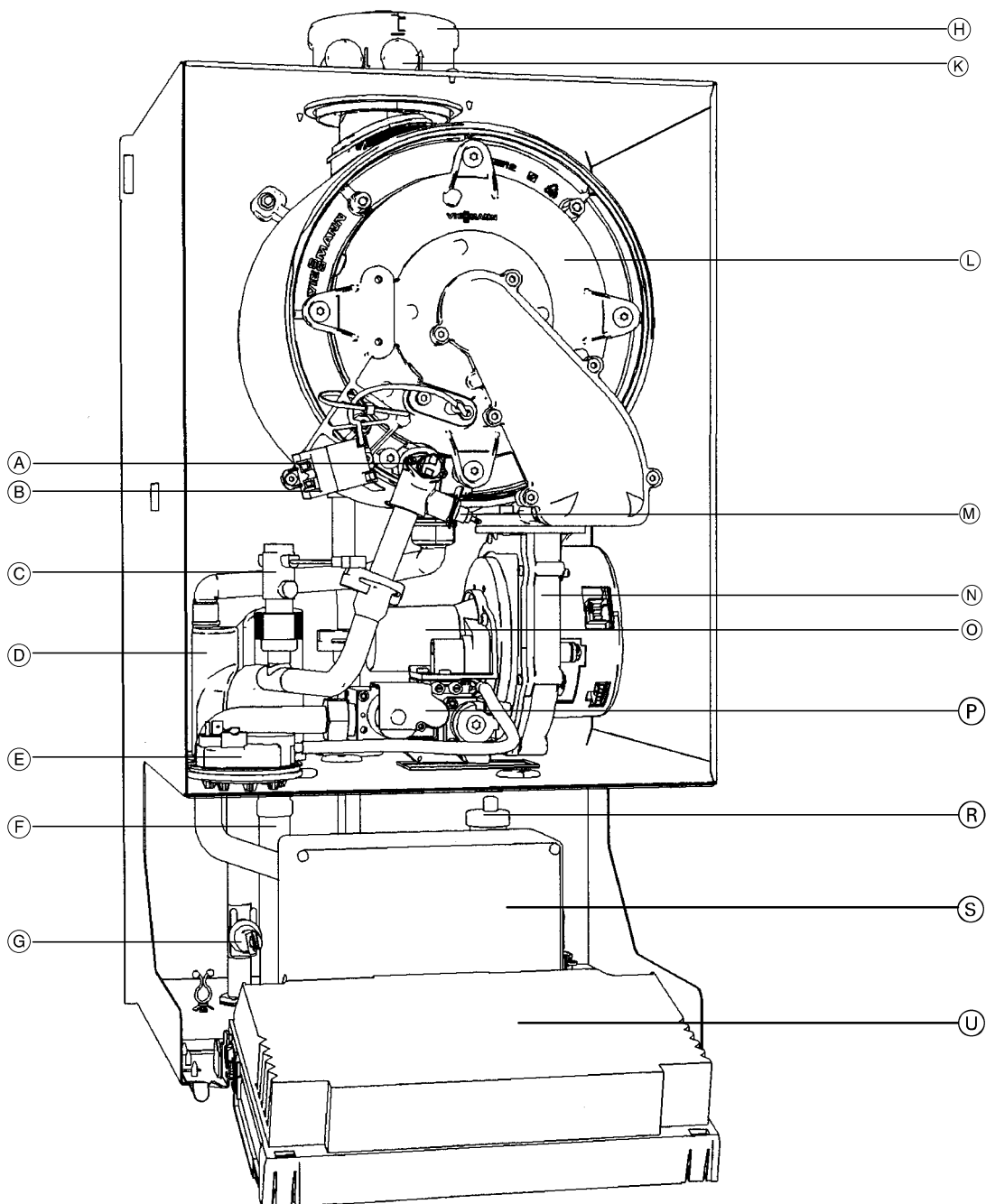
## Overview of Controls and Indicators *(continued)*



### Legend

- Ⓐ Display value or fault code
- Ⓑ Heating mode
- Ⓒ Burner in operation
- Ⓓ Current burner firing rate
- Ⓔ Boiler water temperature in °F (combined with display value)
- Ⓕ Fault
- Ⓖ System pressure (combined with display value)
- Ⓗ Emissions test activated (only for licensed professional heating contractor)

## Overview of Components



### Legend

- |   |                                     |                       |
|---|-------------------------------------|-----------------------|
| (A) Fixed high limit, 210°F/99°C            | (H) Vent pipe adaptor               | (S) Power pump module |
| (B) Ignition transformer module<br>ZIG 2/12 | (K) Test port cap                   | (U) Control console   |
| (C) Flow switch, VK315M                     | (L) Burner mounting flange assembly |                       |
| (D) P-trap                                  | (M) Boiler temperature sensor       |                       |
| (E) Air pressure switch                     | (N) Radial fan RG130, 120/1/60      |                       |
| (F) Condensate hose, 400mm                  | (O) Air + gas inlet venturi         |                       |
| (G) Water pressure sensor                   | (P) Gas valve VK4115V, 120/1/60     |                       |
|   | (R) Air vent w/shutoff base, 3/8"   |                       |

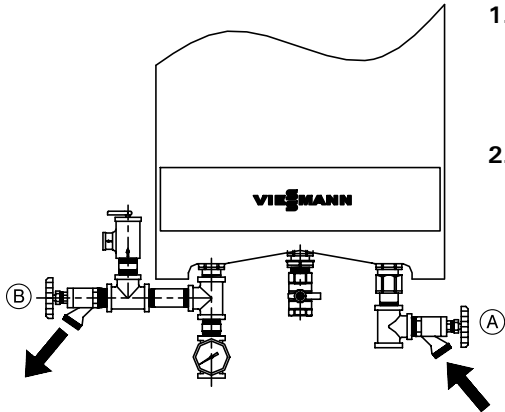
## Procedure Overview

				Page
			Start-up steps	
			Inspection steps	
			Maintenance steps	
<b>S</b>	<b>I</b>	<b>M</b>	1. Fill and vent the heating system .....	45
<b>S</b>			2. Check power supply connection .....	46
<b>S</b>			3. Select appropriate gas type .....	47
	<b>I</b>	<b>M</b>	4. Measure static pressure and running pressure .....	47
<b>S</b>	<b>I</b>	<b>M</b>	5. How the Vitodens 100-W boiler operates... ..	49
	<b>I</b>		6. Relais tests .....	50
<b>S</b>	<b>I</b>	<b>M</b>	7. Clock natural gas meter .....	51
	<b>I</b>		8. Set maximum input .....	51
	<b>I</b>	<b>M</b>	9. Check all primary and secondary circuit connections for leaks .....	52
	<b>I</b>	<b>M</b>	10. Perform combustion analysis .....	52
	<b>I</b>		11. Check venting system for leaks (circular air gap measurement) for sealed combustion, coaxial vent only .....	53
<b>S</b>	<b>I</b>	<b>M</b>	12. Remove burner .....	53
	<b>I</b>	<b>M</b>	13. Check burner gasket and cylinder assembly for damage .....	55
	<b>I</b>	<b>M</b>	14. Check and adjust ignition and ionization electrodes .....	55
	<b>I</b>	<b>M</b>	15. Check condensate drain and clean siphon (P-trap) .....	56
	<b>I</b>	<b>M</b>	16. Check neutralization unit (if applicable) .....	56
	<b>I</b>		17. Clean combustion chamber/heat exchanger surfaces .....	57
		<b>M</b>	18. Check diaphragm expansion tank and system pressure .....	58
	<b>I</b>		19. Check functioning of safety valves .....	58
	<b>I</b>		20. Check gas pipes and fittings for leaks .....	59
	<b>I</b>		21. Reinstall burner .....	59

## Steps

### Start-up

#### 1. Fill and vent heating system



1. Open system isolation valves (if installed).
2. Check inlet pressure of the diaphragm expansion tank.

→ **Please note:**

Before filling the heating system with water, check that all necessary flow check valves are installed.

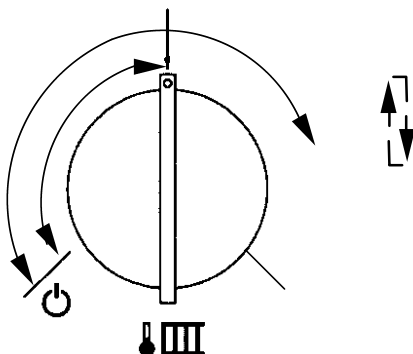
→ If the nitrogen pressure of the precharged expansion tank is less than the static pressure of the system, inflate membrane pressure to slightly exceed pressure of system. The static pressure required at the tank is based upon the static height of the system. The system fill pressure value must be equal to the expansion tank pressure value at approx. 60 °F/15.6 °C.

### CAUTION

Unsuitable fill water increases the level of deposits and corrosion, and may lead to damage to the equipment.

- Thoroughly flush the entire heating system prior to filling with water.
- Only use fill water of potable quality.
- Soften fill water harder than 150 ppm temporary hardness.
- Inhibitors or antifreeze additives suitable for heating systems may be added manually.

During fill and removal of air, the boiler pump can be activated. To activate the pump, in less than 2 seconds turn selector dial to stand-by position from a control range (counter-clockwise) and then right back into the control range (clockwise). The pump will run for 30 minutes and cancel the request automatically. A rotating digital segment will appear on the display (see below).



3. To remove debris and/or sludge ensure that the system piping is flushed out. Failure to do so may cause sediment in the boiler causing overheating and damage not covered by warranty.
4. *Optional:*  
Fill the heating system with water at the boiler filling tap (A) and drain air completely from the drain tap (B).

To remove air from the heat exchanger

- Connect a hose to the boiler filling tap (A) and connect the other end to fresh water supply (or heating medium).
- Open the fresh water supply valve and then open the boiler filling tap (A) slowly to fill the boiler with water. Isolation valves (not shown) to isolate system components must be closed during fill/bleed process.
- Flush the boiler heat exchanger via the boiler supply and return (for at least 10 mins.) until all air has been removed from the boiler.
- When the drain tap (B) begins to bleed water, close the boiler drain valve and open system isolation valves.

Continued on following page.

→ System fill pressure must be approximately 3 psig higher than the static head when the system is cold.

→ Water treatment should be considered in areas where it is known that boiler feed water contains a high mineral content and hardness. In areas where freezing might occur, an antifreeze may be added to the system water to protect the system. Please adhere to the specifications given by the antifreeze manufacturer. Do not use automotive silicate-based antifreeze. Please observe that an antifreeze/water mixture may require a backflow preventer within the automatic water feed and influence components such as diaphragm expansion tanks, radiation, etc. A 40% antifreeze content will provide freeze-up protection to -10°F/-23°C. Do not use antifreeze other than specifically made for hot water heating systems. System also may contain components which might be negatively affected by antifreeze. Check total system frequently when filled with antifreeze.

Steps *(continued)*

Start-up 1. Fill and vent heating system (continued)

- 5. Check system pressure.
- 6. Ensure proper/adequate fuel supply exists. Open gas shutoff valve.  
  
Max. boiler  
operating pressure .....45 psig  
Min. boiler  
operating pressure .....14 psig  
Pressure relief valve .....30 psig

Start-up 2. Check power supply connection

A power module is supplied with the Vitodens 100-W boiler, which requires a 120 VAC power supply.

The voltage at connector X3 must be 120 V (see wiring diagram).

**Neutral conductor**  
The electrical power supply must have a neutral conductor.

IMPORTANT

In Canada all electrical wiring is to be done in accordance with the latest edition of CSA C22.1 Part 1 and/or local codes. In the U.S. use the National Electrical Code ANSI/NFPA 70. The heating contractor must also comply with both the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI, ASME CSD-1.

→ **Please note:**  
The outer conductor "L" and the neutral conductor "N" must not be interchanged.  
See wiring diagram in section entitled "Additional Information" in this manual.

Steps *(continued)*

Start-up and Maintenance

3. Select appropriate gas type

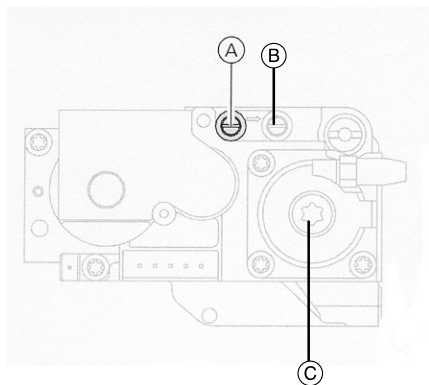
1. Ensure that the fuel type listed on the boiler rating plate is the correct type for the installation being attempted.
2. Record fuel type in Maintenance Record on page 74.

***The Vitodens 100-W boiler is for use with gases whose characteristics fall within the following ranges. Do not use any other types of gas.***

		Natural gas
Heating value (gross)	Btu/ft <sup>3</sup>	970 to 1100
Specific gravity		0.57 to 0.70
Ultimate carbon dioxide (CO <sub>2</sub> )	%	11.7 to 12.2

Start-up and Maintenance

4. Measure static pressure and running pressure



Legend

- (A) Inlet gas pressure measurement port
- (B) Outlet pressure port (connected to differential pressure switch)
- (C) **Do not remove this screw or attempt to make any adjustment to the gas valve**

Static pressure

1. To measure static and/or running pressure remove burner cover panel as per the removal and reinstallation instructions on page 18 in these instructions.
2. Close gas shutoff valve.
3. Loosen screw in test nipple (A) on the gas combination valve, **do not remove completely**. Connect manometer.
4. Open the gas shutoff valve.
5. Measure static pressure. Values must be:
  - 14 "w.c. max. for NG
6. Enter measured value into Maintenance Record on page 74 in this manual.
7. Start up boiler, using the on/off service switch (field supplied).

**IMPORTANT**

A CO measurement (see page 50) must be taken before and after working on gas appliances to eliminate risks to health and to guarantee the satisfactory condition of the system.

**IMPORTANT**

The burner is automatically ignited and starts operation after a safety time has elapsed.  
During initial start-up, the unit may indicate a fault because of air in the gas supply pipe. After approx. 5 seconds, press the burner reset button (see page 60). The ignition procedure is repeated. This boiler employs a direct spark ignition system with 3 trials for ignition.

Steps *(continued)*

Start-up and Maintenance

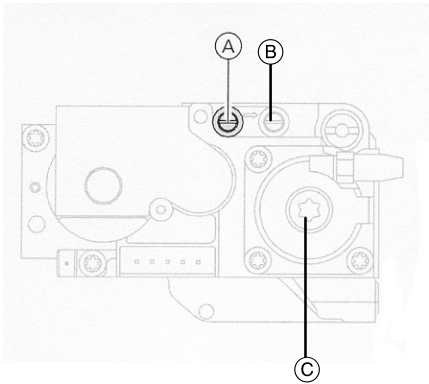
4. Measure static pressure and running pressure (continued)

Running pressure

8. All measurements must be made under high fire conditions.  
Measure the running pressure; value must be:
- Use suitable measuring instruments calibrated with a minimum resolution of 0.04 "w.c. for measuring the running pressure.

Running supply pressure with Natural gas	Corrective action
■ under 4 "w.c.	Do not attempt adjustment. Call local gas utility to increase pressure.
■ 4 to 14 "w.c.	Start up boiler.
over 14 "w.c.	Do not attempt adjustment. Call local gas utility to decrease pressure. Boiler valve must not be exposed to pressure over 14 "w.c.

9. Enter gas type into Maintenance  
Record on page 74 in this manual.



Measuring running gas supply pressure, using test nipple (A)

10. Switch off the heating system on/off service switch (boiler is shut down), close the gas shutoff valve, remove the manometer and re-tighten the screw in the test nipple (A).
11. Open gas shutoff valve and check that the test nipple (A) and all gas connections are gas-tight.

**WARNING**  
Ensure that there is no open flame in the room.

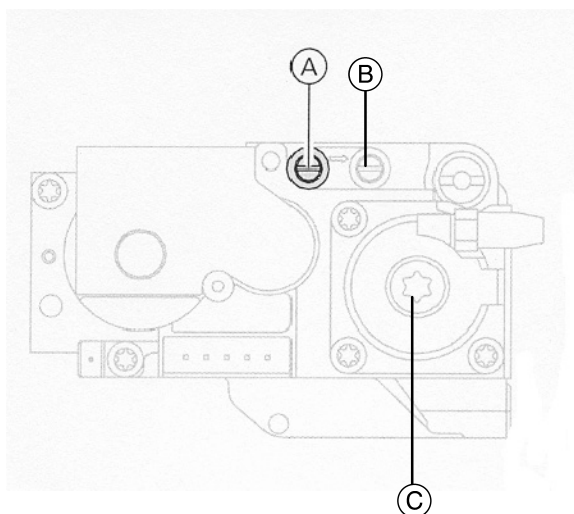
**WARNING**  
Never purge a gas line into a combustion chamber. Never use matches, candles, flame, or other sources of ignition for purpose of checking leakage. Use a soap-and-water solution to check for leakage. A failure to follow this warning could result in fire, explosion, personal injury, or death.



**Steps** *(continued)***Start-up and Maintenance****5. How the Vitodens 100-W boiler operates...**

The Vitodens 100-W boiler uses a premix combustion system, which is designed to deliver a measured air-gas mixture to the burner for complete combustion. The gas is injected upstream of the blower. The burner and heat exchanger are part of a forced-draft design. The benefits of forced-draft systems are lower component temperatures, direct air-fuel connection (premix) for improved mixing, and longer service life of the boiler due to mild to moderate ambient conditions.

The cylinder burner blower and the combination gas valve are factory calibrated and pre-adjusted for optimum boiler performance at all firing rates through a pneumatic link between combustion air and gas flows. Blower speed is automatically increased or decreased based on heat demand, thereby regulating the amount of combustion air drawn. The pneumatic link between air and gas introduces the required amount of gas for correct combustion to meet the current heat demand, based on a linear relationship between  $\Delta P$  air and  $\Delta P$  gas.

**Legend**

- Ⓐ Inlet gas pressure measurement port
- Ⓑ Outlet pressure port (connected to differential pressure switch)
- Ⓒ **Do not remove this screw or attempt to make any adjustment with inside screw**

**⚠ WARNING**

**FOR FACTORY CALIBRATING PURPOSES, THE COMBINATION GAS VALVE IS EQUIPPED WITH ADJUSTMENT SCREW "C". DO NOT ATTEMPT TO ADJUST OR READJUST THESE SCREWS. ANY ATTEMPT TO TAMPER WITH FACTORY PRE-ADJUSTED SETTINGS WILL LEAD TO UNSTABLE OPERATION AND WILL AFFECT BOILER WARRANTY.**

## Steps *(continued)*

### Start-up and Maintenance

### 6. Relais tests

The Vitodens 100-W boiler is factory preset for operation with natural gas. It is recommended that a CO<sub>2</sub> check be performed at the boiler vent pipe adaptor as part of the initial start-up/maintenance procedure.

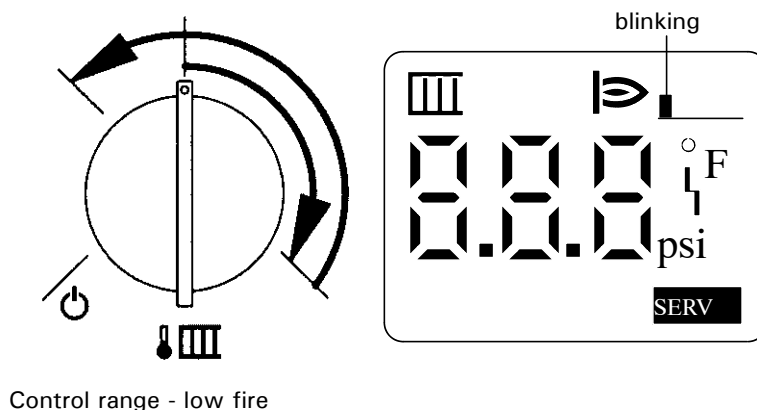
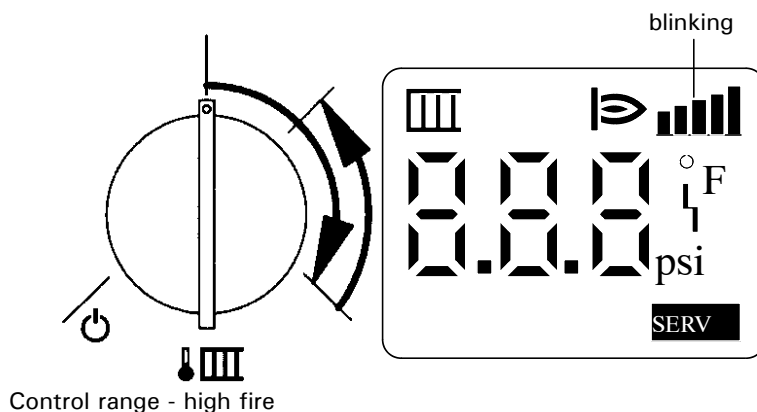
The CO<sub>2</sub> value lies within the range of ■ 6.6 to 10.0 % for natural gas  
The CO<sub>2</sub> value measured must be compared with the above CO<sub>2</sub> value.

If the CO<sub>2</sub> value measured lies more than 1 % outside the stated range, perform the following step:

■ Check the venting system for leaks (refer to the Vitodens Venting System Installation Instructions).

### IMPORTANT

The cylinder burner of the Vitodens 100-W is preset. No adjustment or readjustment of the burner is required.



1. To bring the boiler to a high fire position, from a 12:00 o'clock position quickly (in less than 2 seconds) turn selector dial "tr " clockwise to the end, then back again into the high fire control range (between 12:00 and 4:00 o'clock). See top illustration on left. Turning the selector dial "tr " counter clockwise between the 12:00 and 8:00 o'clock position will bring the boiler to the low fire position. See illustration on bottom left.

2. Check the CO<sub>2</sub> content. Should the actual value deviate by more than 1% from the above range, check the seals in the balanced flue system.

3. Enter actual values into the service report.

4. To bring the boiler to a low fire position, from a 12:00 o'clock position quickly (in less than 2 seconds) turn selector dial "tr " clockwise to the end, then back again into the low fire control range (between 12:00 and 8:00 o'clock). See bottom illustration on left. Turning the selector dial "tr " clockwise between the 12:00 and 4:00 o'clock position will bring the boiler to the high fire position. See illustration on top left.

5. Check the CO<sub>2</sub> content. Should the actual value deviate by more than 1% from the above range, check the seals in the balanced flue system.

6. Enter actual values into the service report.

7. Once checked, turn the selector dial "tr " in less than 2 seconds clockwise to the end and back again into the control range.

*Note:*  
If step 7 above is not performed, the process will end automatically after 30 minutes.

**Steps** *(continued)***Start-up and Maintenance****7. Clock natural gas meter**

Clock natural gas meter to verify input

1. Ensure all other gas equipment served by the meter is turned off during timing of gas input to the Vitodens 100-W boiler.
2. Measure the time in seconds it takes for the boiler to use 10 cu. ft. of gas. Divide  $3600 \times 10$  by the number of seconds and you get the number of cu. ft. of gas used per hour. Multiply this number by the heating value of the gas to obtain Btu per hour input.

For example:

A Vitodens 100-W, WB1A 8-30 boiler (100 000 Btu/h input) requires 209 seconds to use 10 cu. ft. of natural gas. After contacting the local utility, you find the heating value is e.g. 1000 Btu per cu. ft. Therefore,  
 $3600 \times 10 \times 1000 \div 209 \approx 100\,000$  Btu/h input.  
 Therefore, the boiler input is correct.

**Burner input formulas**

(up to 4500 ft.):

$INPUT = (3600 \div t) \times 1000$  where

$t = \text{TIME (sec.) for } 1 \text{ ft.}^3$

$INPUT = (3600 \times .01 \times 1000 \times 35.31) \div T$

where

$T = \text{TIME (sec.) for } .01 \text{ m}^3 \text{ natural gas}$

**IMPORTANT**

**A boiler underfired by 5% is still acceptable. Do not overfire the boiler.**

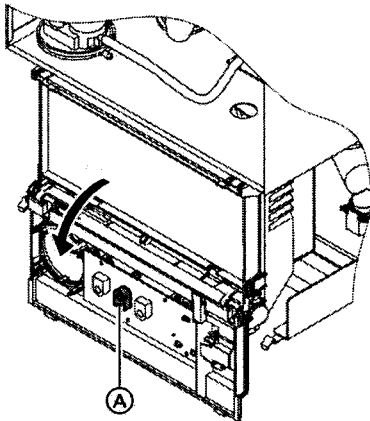
**CAUTION**

**Always contact your gas utility to obtain the correct heating value before clocking the meter.**

**Start-up****8. Set maximum input**

*Note:*

*It is possible to restrict the maximum heating input to match the exact heating load requirements. You can limit the input via the modulation range.*



1. Turn OFF main power supply and guard against accidental reactivation.
2. Unhook the front of the control unit and flip down.
3. Start up the boiler and at the potentiometer (A) select the maximum boiler input. Check the adjustment for the corresponding gas throughput.
4. Flip up the control unit front and snap into position.

*Note:*

*The input restriction mentioned above does not apply when connecting to ST input terminals (DHW tank / external heat demand).*

**Steps** *(continued)*

**Start-up and Maintenance**

**9. Check all primary and secondary circuit connections for leaks**

Check heating system and domestic hot water connections (if applicable). Ensure all connections are pressure tight. Correct any leaks found on fittings, pumps, valves, etc.

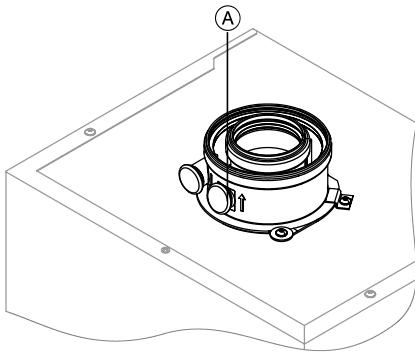
**Start-up and Maintenance**

**10. Perform combustion analysis**

**IMPORTANT**

A CO measurement (see page 50) must be taken before and after working on gas appliances to eliminate risks to health and to guarantee the satisfactory condition of the system.

Record the measured combustion values in the sequence stated in the Maintenance Record on page 74 in this manual.

**Steps** *(continued)***Start-up and Maintenance****11. Check venting system for leaks (circular air gap measurement)  
For sealed combustion, coaxial vent only**

Ⓐ Combustion air measuring point

Viessmann strongly recommends that the heating contractor perform a simplified leak test during boiler start-up. For this purpose it is sufficient to measure the CO<sub>2</sub> concentration of the combustion air in the coaxial gap of the air intake pipe. The vent pipe is considered sufficiently leak-proof if a CO<sub>2</sub> concentration in the combustion air no higher than 0.2% or an O<sub>2</sub> concentration no lower than 20.6% is measured.

If higher CO<sub>2</sub> values or lower O<sub>2</sub> values are measured, check venting system thoroughly.

**Please note!**

The vent pipe adaptor comes with two measurement ports, one for combustion air intake measurement and one for flue gas measurement.

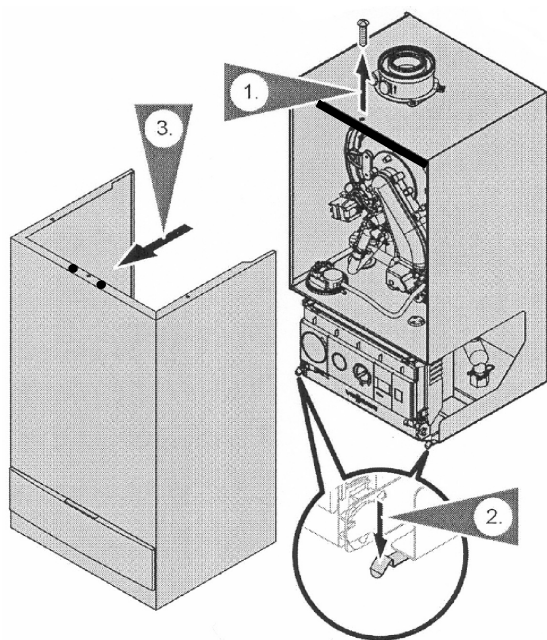
**Please note!**

This test is not applicable for single - wall venting system (non-sealed combustion).

**Maintenance****12. Remove burner**

To ensure continued efficient operation of the boiler, it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend on the particular installation conditions and usage but in general once a year should be adequate. Any service work must be carried out by a licensed professional heating contractor.

The boiler incorporates a flue sampling point in front of the flue outlet. The flue gases can be analyzed if required. The push fit cap may be removed and a sample tube installed. The push fit cap must be replaced after use. The flue gas sample will enable the heating contractor to judge whether any major action is required. Before commencing any service operation, isolate and secure the main power supply against accidental reactivation, and turn off the main gas supply.



1. Remove the screw at the top of the boiler.

2. Press down the springs on the underside of the boiler.

3. Remove the front panel.

4. Switch off the main power supply.

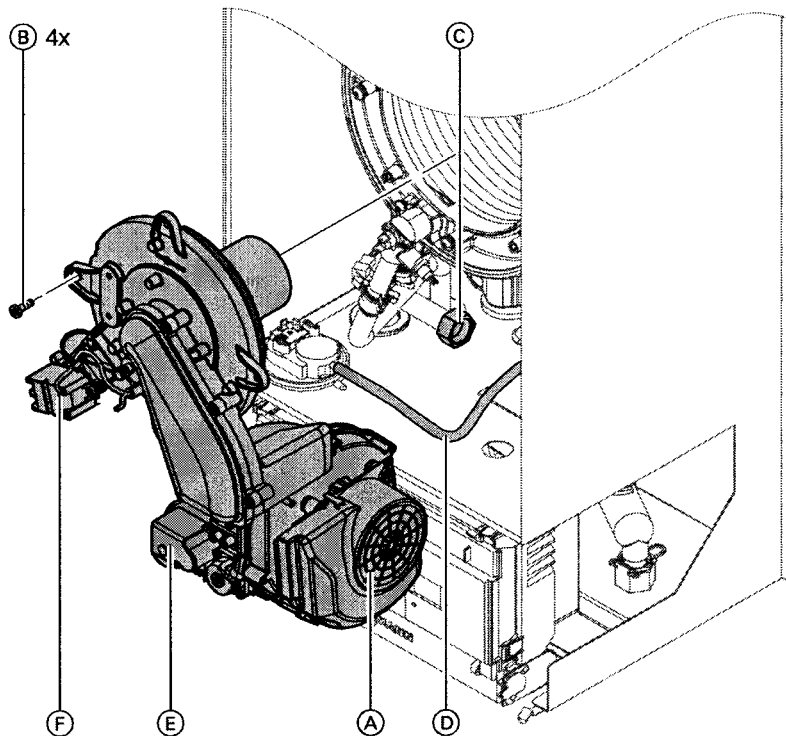
5. Close gas shutoff valve and secure against reopening.

*Continued on following page.*

### Steps *(continued)*

#### Maintenance

#### 12. Remove burner (continued)



6. Disconnect electrical cables from gas valve (E), and ignition transformer unit (F).

7. Remove connection hose (D) from air pressure switch.

8. Loosen the fitting (C) on the gas connection pipe.

9. Loosen four Torx (T-30) screws (B), remove burner and disconnect all electrical cables from blower motor (A).



#### CAUTION

To avoid damage to the burner, do not lay burner on its cylindrical burner tube.

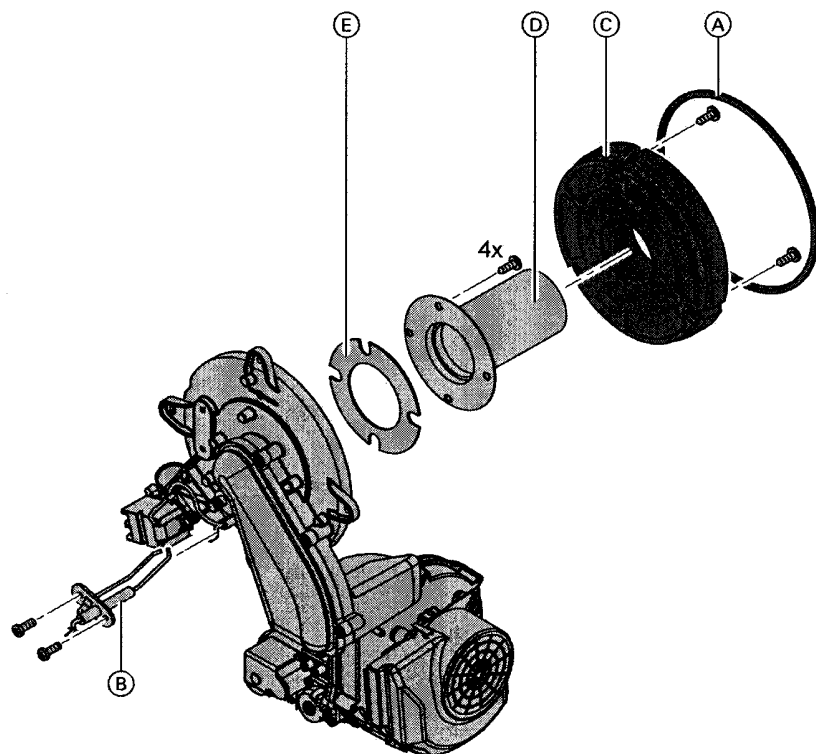
Failure to heed this caution may cause damage to the burner tube, which may lead to improper operation.

## Steps (continued)

## Maintenance

## 13. Check burner gasket and cylinder assembly for damage

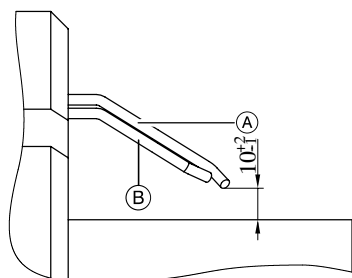
Check the burner gasket (A) and burner cylinder assembly (D) for damage and replace if necessary. Replace the burner cylinder assembly if damaged.



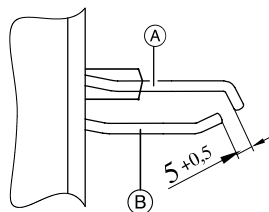
1. Remove electrode block (B).
2. Loosen the three Torx screws and remove the thermal insulation ring (C).
3. Loosen the four Torx screws and remove burner cylinder assembly (D) and assembly gasket (E).
4. Fit and secure new burner cylinder assembly (D) and new assembly gasket (E).  
*Tighten to a torque of 2.5 lb.ft. / 3.5 Nm using a calibrated torque wrench.*
5. Reinstall thermal insulation ring (C).
6. Reinstall electrode block (B).  
*Tighten to a torque of 1.8 lb.ft. / 2.5 Nm using a calibrated torque wrench.*

## Maintenance

## 14. Check and adjust ignition and ionization electrodes



Side view



Top view

1. Check ignition and ionization electrode (A) for wear and contamination.
2. Clean electrodes with a small brush or emory paper.
3. Check clearances. If clearances are not satisfactory or the electrodes are damaged, replace electrode block and gasket and align. Tighten fastening screws for the electrodes to a torque of 1.8 lb.ft. / 2.5 Nm using a calibrated torque wrench.

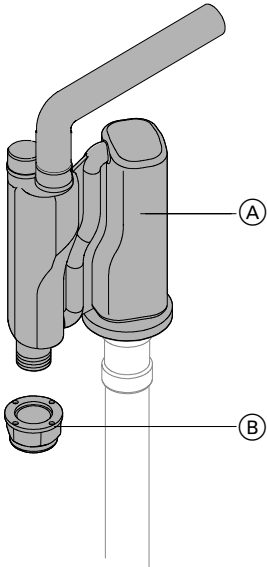
## Legend

- (A) Ignition and ionization electrodes  
(B) Grounding rod

### Steps *(continued)*

#### Maintenance

#### 15. Check condensate drain and clean siphon (P-trap)



1. Check the siphon to ensure unimpeded drainage of condensate.
2. Place appropriate container underneath siphon (A).
3. Remove sealing cap (B) and drain siphon content into the container.
4. Replace the sealing cap (B) w/gasket.
5. Fill the siphon (A) with water by pouring 10 fl.oz. / 0.3L of water into the combustion chamber.

#### IMPORTANT

If the condensate does not drain freely, condensate will accumulate in bottom part of boiler resulting in a burner shut-down (fault message F4). The combustion chamber refractory will also become wet at the bottom portion. Do not restart the boiler immediately with a wet combustion chamber refractory. This will damage the refractory. Either dry the refractory or replace it.



*Installation Instructions  
Neutralization Unit  
(if applicable)*

#### Maintenance

#### 16. Check neutralization unit (if applicable)

Accessory

1. Check the pH value of the condensate with a pH measuring strip. If the pH value is less than 6.5, replace granulate.
2. If contaminated:  
Rinse neutralization unit with tap water.
3. Add granulate as marked.

#### IMPORTANT

pH measuring strip is field supplied.

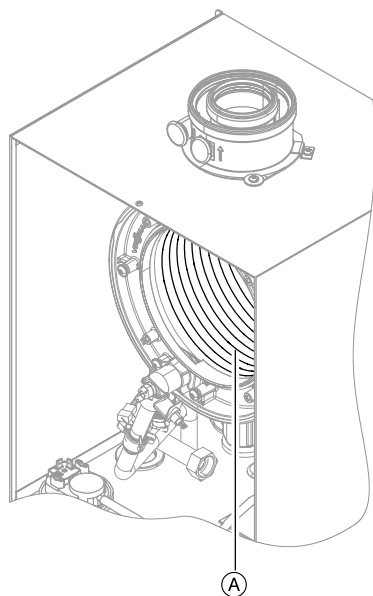
#### IMPORTANT

The granulate is consumed as it neutralizes the condensate. The red marking indicates the min. filling level.



*Installation Instructions  
Neutralization Unit*



**Steps** *(continued)***Maintenance****17. Clean combustion chamber/heat exchanger surfaces**

1. Remove burner cover panel (if still installed) as per the removal and reinstallation instructions on page 53 in this manual, and reinstall panel upon completion of service work.

2. If necessary, clean the combustion chamber (A) and heat exchanger surfaces (B) with a brush and/or rinse with water.

Use solvent-free cleaning agents to remove residues:

- Remove deposits of soot with alkaline agents containing tenside.
- Remove coatings and (yellowish brown) surface discoloration with phosphoric acid-based "Antox 75 E Plus", or citric acid-based CitriSurf™ 3050 by Stellar Solutions Inc.
- Rinse thoroughly with water.

3. Connect electrical cables to corresponding parts.

→ **Please note:**

*Be careful not to scratch parts which are in contact with flue gas. Use plastic brushes, not wire brushes!*

*The cleaning agents must not contain hydrocarbon-based solvents or potassium.*

**! WARNING**

**Follow cleaning agent manufacturer's safety instructions and wear appropriate protective equipment.**

**IMPORTANT**

**Perform leak test.**

Steps *(continued)*

Start-up and Maintenance

18. Check diaphragm expansion tank and system pressure

Perform check on the system when cold.

1. Drain boiler/system and reduce pressure until the manometer reading is "0".
2. If the nitrogen pressure of the precharged expansion tank is less than the static pressure of the system, inflate membrane pressure to slightly exceed pressure of system.  
The static pressure required at the tank is based upon the static height of the system. The system fill pressure value must be equal to the expansion tank pressure value at approx. 60 °F/15.6 °C.

→ **Example**  
Static head of 33 ft./10 m (distance between boiler and topmost heat emitter surface) corresponds to a static pressure of 1 bar/15 psig.
3. Top up with water until filling pressure is higher than the inlet pressure of the diaphragm expansion tank.

→ With the system cold, the filling pressure must be approx. 3 psig higher than the static pressure.  
Max. operating pressure: ..... 45 psig  
Min. operating pressure: ..... 14 psig
4. When starting up the system for the first time, mark this value as the minimum filling pressure on the manometer.

→ A lower manometer reading usually indicates loss of water due to leakage. All leaks must be repaired.

Start-up and Maintenance

19. Check functioning of safety valves

- Ensure proper operation of low water cut-off(s) (if applicable), pressure relief valve, and pump(s).

Follow local regulations with respect to backflow preventers.
- Check pressure gage, air vent and pressure relief valve. Ensure that pressure relief valve does not leak and that it operates in accordance with information provided by the manufacturer.

If oil-lubricated pumps are used, ensure proper lubrication.
- Refer to maintenance instructions supplied with low water cut-offs, pumps, etc.

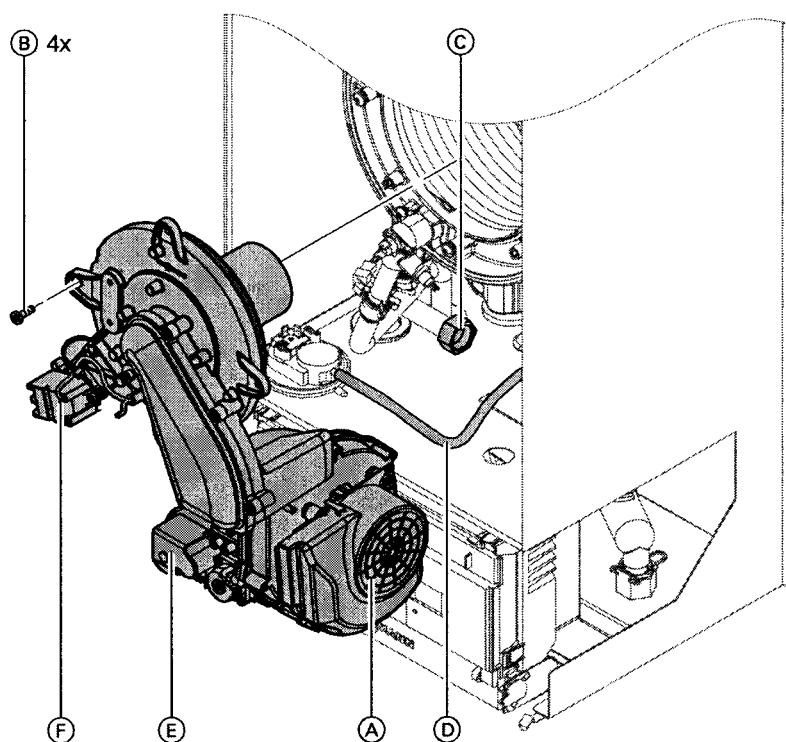
If motorized zone valves are used, refer to maintenance instructions provided with zone valves.
- Flush float water type low water cut-offs (if used).

**Steps** *(continued)***Start-up and Maintenance****20. Check gas pipes and fittings for leaks****WARNING**

The gas supply piping must be leak tested before placing the boiler in operation.

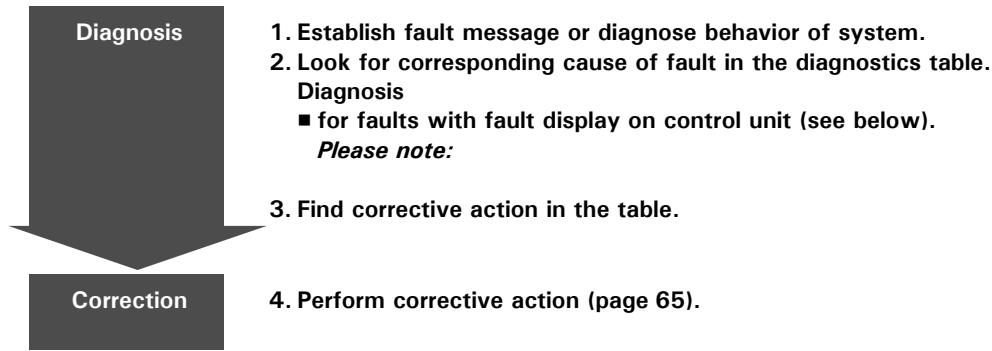
**CAUTION**

Ensure all joints of gas line are pressure tight and that gas valves do not leak when under normal operating pressure (use approved leak detection liquid).

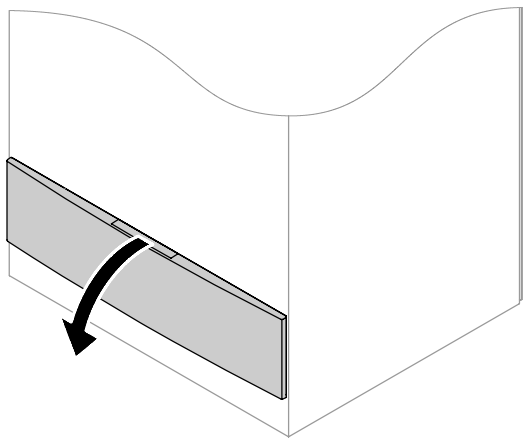
**Start-up and Maintenance****21. Reinstall burner**

1. Replace electrical cables from fan motor (A), mount burner, and diagonally tighten 4 torque screws (B) (approx. 3 ft.lbs./4 Nm using a calibrated torque wrench).
2. Insert new gasket and tighten the fitting (C) on the gas connection pipe.
3. Insert air pressure switch connection pipe (D) onto the gas valve "OUT" connector (P2 on the switch).
4. Replace electrical cables from gas valve (E), and ignition transformer unit (F).
5. Open gas shutoff valve and switch on power supply.

Troubleshooting Steps

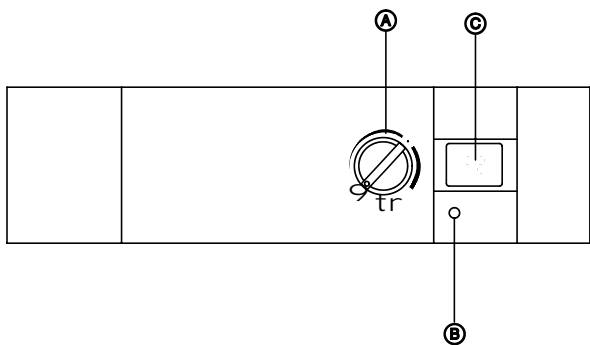


Overview of Controls and Indicators



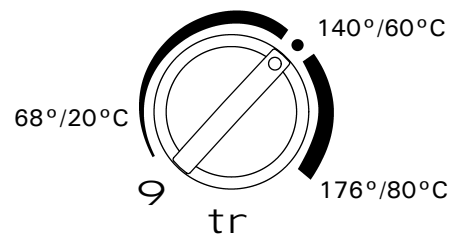
Opening the control unit

Controls and indicators are located behind the hinged front cover.



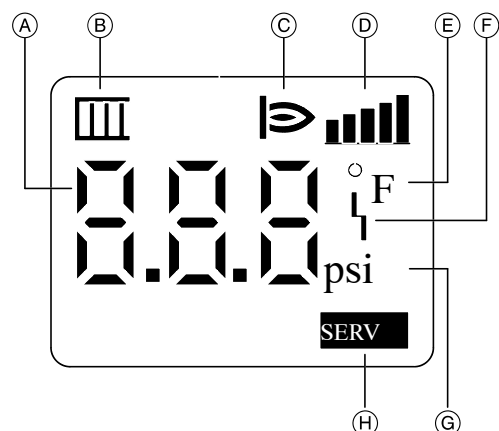
Control and display elements

The control unit is preset at the factory for standard operation. Your heating system is ready for use. The factory presets may be individually adjusted to suit your specific requirements.



- Legend
- Ⓐ tr boiler water temperature selector dial
  - Ⓑ Display, fault and reset button
  - Ⓒ LCD display

## Overview of Controls and Indicators (continued)



### Legend

- Ⓐ Display value or fault code
- Ⓑ Heating mode
- Ⓒ Burner in operation
- Ⓓ Current burner firing rate
- Ⓔ Boiler water temperature in °F (combined with display value)
- Ⓕ Fault
- Ⓖ System pressure (combined with display value)
- Ⓗ Emissions test activated (only for licensed professional heating contractor)

## Changing Room Temperature

In case a separate external room temperature controller (thermostat) is installed, the desired room temperature will be adjusted using this device.

Make adjustments using the appropriate operating instructions only.

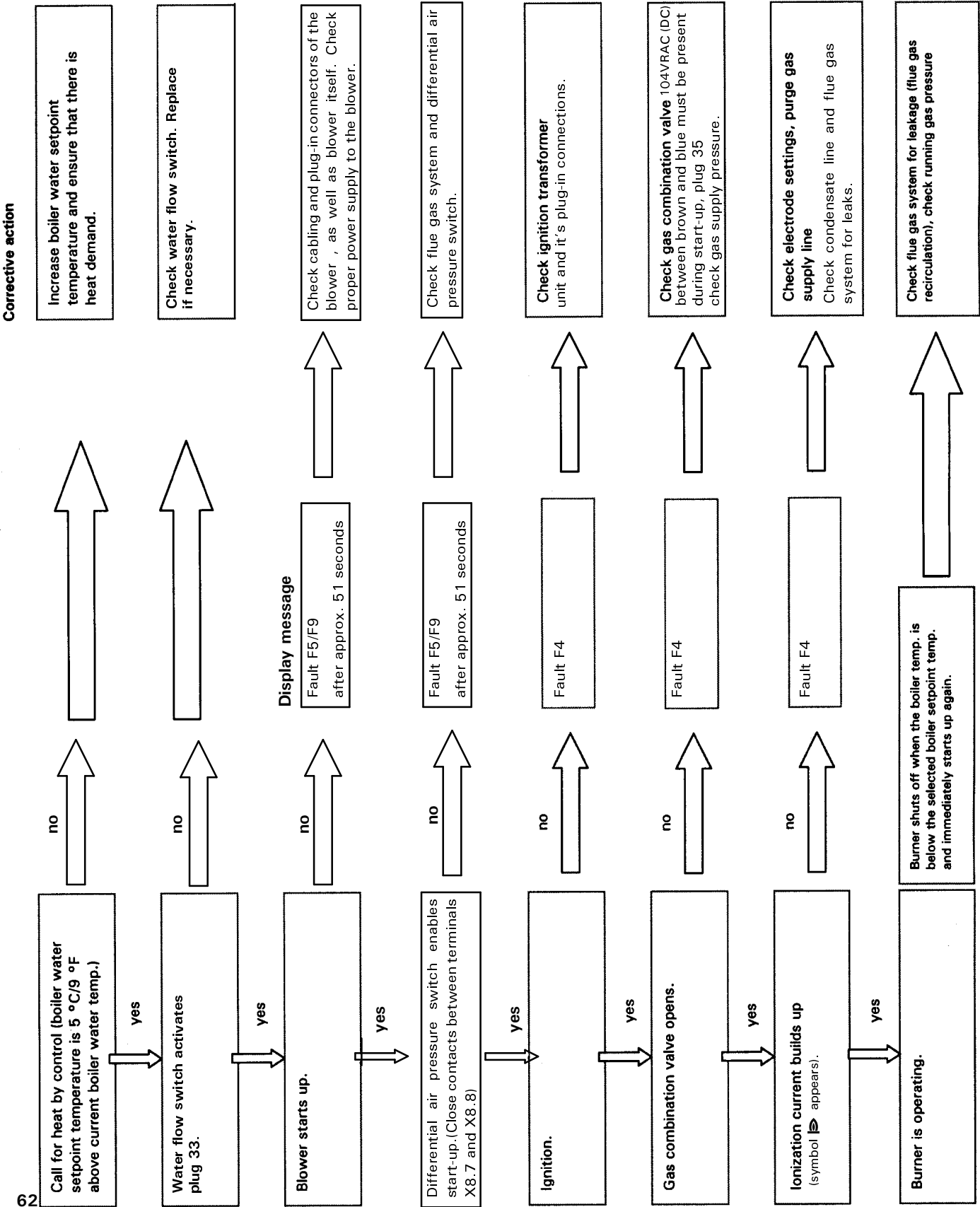
### *Please also note:*

If thermostatic radiator valves are installed in the room where the control is installed they must be fully open.

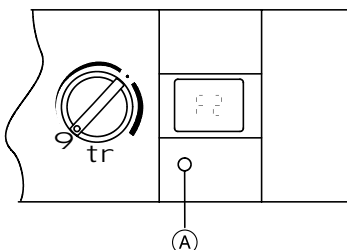
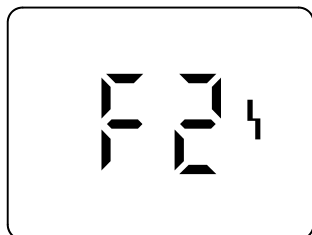
In case the room temperature setting on the separate room temperature controller is not sufficient to achieve the desired room temperature (e.g. during a particularly cold winter), the boiler water temperature can be adjusted accordingly using the boiler water temperature selector dial.

Diagnosis

Sequence of operation and potential faults during each start-up cycle



# Diagnosis *(continued)*



Faults are indicated by a flashing fault code with fault code symbol "U" and the reset button (A) is illuminated. For fault code explanations see the following table.

**Diagnostics table: Faults with fault display on control unit**

Fault message in display window	System behavior	Cause	Corrective measures
0b	Burner blocked	Insufficient water flow. Incorrect flow direction. Defective flow switch.	Check proper heating circuit pump size and operation. Check flow direction. Check flow switch connection cable.
0c	Burner blocked	Insufficient power supply	Contact your local hydro company.
30	Burner blocked	Boiler temperature sensor shorted out	Check the boiler temperature sensor (see page 65).
38	Burner blocked	Boiler temperature sensor lead break	Check the boiler temperature sensor (see page 65).
b1	Control mode	Communication fault - internal programming unit	Check connections and replace the control unit if necessary.
b5	Control mode	Internal fault	Replace control unit.
E4	Burner blocked	Fault with the supply voltage (power pump module)	Check connections. Replace control unit.
E5	Burner blocked	Internal fault	Check ignition and ionization electrodes and leads. Press "Reset".
E6	Burner blocked	Water pressure too low	Top up water .
F0	Burner blocked	Internal fault	Replace control unit.
F2	Burner in fault mode	Fixed high limit tripped	Check the heating system water level. Check the circulation pump operation. Vent the heating system of air. Check the fixed high limit and leads. Press "Reset".
F3	Burner in fault mode	The flame signal is already present at burner start	Check the ionization electrode and leads. Press "Reset".
F4	Burner in fault mode	No flame signal is present	Check the ionization electrode and leads, check the gas pressure, check the gas combination valve, control unit and condensate drain see page 56). Press "Reset".
F5	Burner blocked	Faulty air pressure switch	Check the air pressure switch and the interconnecting cable.



*Check the burner air/gas mixture damper. Reference the Burner Damper Replacement Instructions.*

## Diagnosis *(continued)*

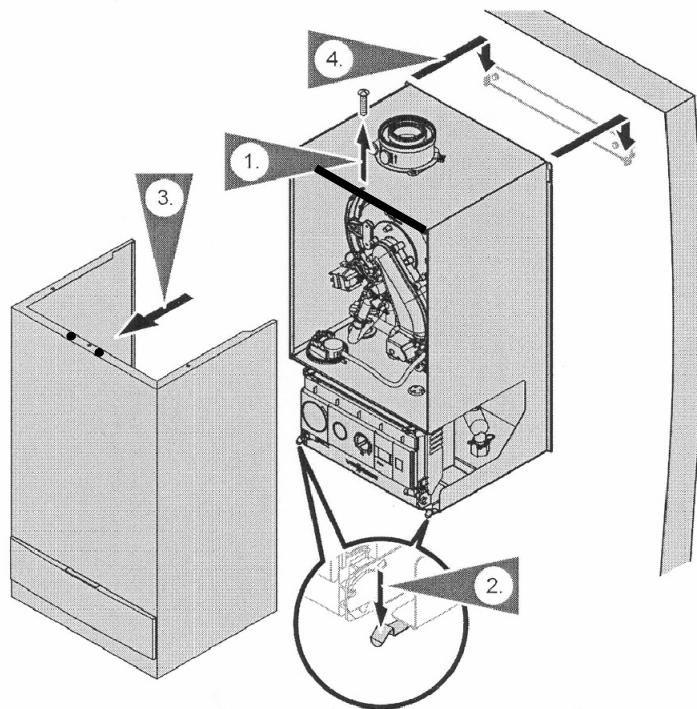
Diagnostics table: Faults with fault display on control unit *(continued)*

Fault message in display window	System behavior	Cause	Corrective measures
F7	Burner blocked	Faulty water pressure sensor	Check the water pressure sensor and the interconnecting cable.
F8	Burner in fault mode	Combination gas valve closes too late	Check the gas combination valve. Check both air and gas paths. Press "Reset".
F9	Burner in fault mode	Blower speed too low at burner start	Check the blower, check the blower cables and supply, check the blower control. Press "Reset".
FA	Burner in fault mode	Blower not at stand-still (blower must be in stand-still when in stand-by mode)	Check the blower, check the blower cables, check the blower control. Press "Reset".
Fd	Burner blocked	Burner control unit fault	Check the ignition electrodes and leads. Check whether a strong interference (EMC) field exists near the equipment. Press "reset". If the fault is not removed, replace the control unit.
FE	Burner blocked	Faulty main PCB, or faulty coding plug	If the equipment will not restart after resetting, replace control unit
8	Burner in fault mode	DIP switch S2 is set to "ON"	Set DIP switch S2 back to "OFF"
58	Burner in fault mode	DIP switch S4 is set to "ON"	Set DIP switch S4 back to "OFF"
89	Non-permanent lock-out (burner in fault mode)	Communication error OpenTherm Module	Turn boiler OFF, then ON  Check communication cable on Terminals X3.3, X3.4 on boiler controls. Check connection on OT-Module sub base Terminals 12, 13.  Check 24VAC output of PPM of the boiler Terminals X4.3, X4.4 (RT Terminals).  Check for 0-10VDC input signal (a min. of 3.0 volts is required to start up the boiler).



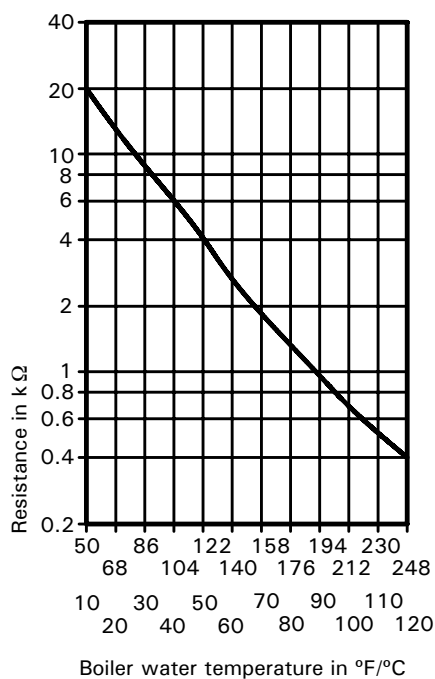
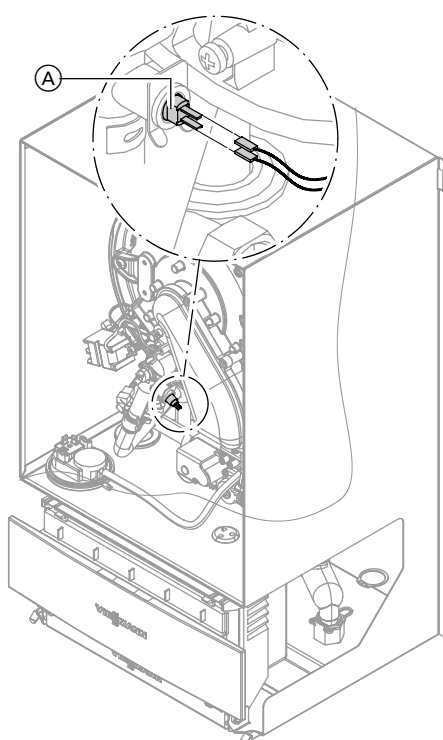
# Correction

## Remove front cover panel



1. Remove the screw at the top of the boiler.
2. Press down the springs on the underside of the boiler.
3. Remove the front cover panel.
4. Lift the front cover panel from the wall mounting frame.

## Check boiler temperature sensor



1. Disconnect cables from boiler temperature sensor (A).
2. Measure resistance of the boiler temperature sensor and compare with resistance/boiler water temperature curve shown on the left.
3. If the value measured differs significantly, replace the sensor.

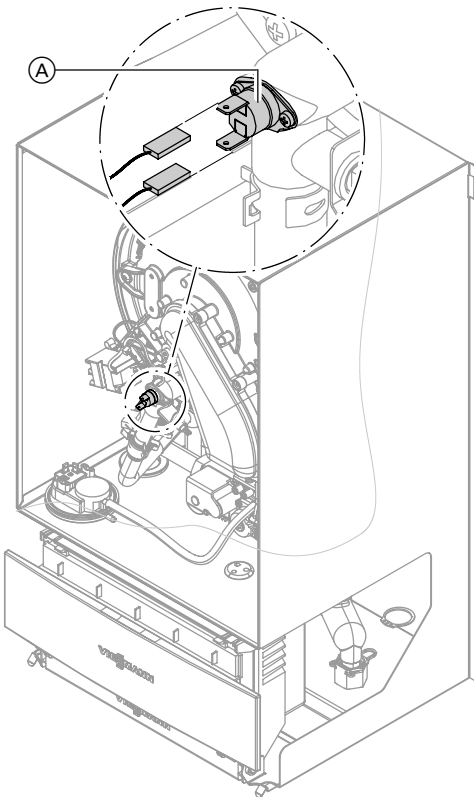
### **WARNING**

The boiler temperature sensor is immersed in the heating water (risk of scalding). Drain the boiler before replacing the sensor.

### Correction *(continued)*

#### Check fixed high limit

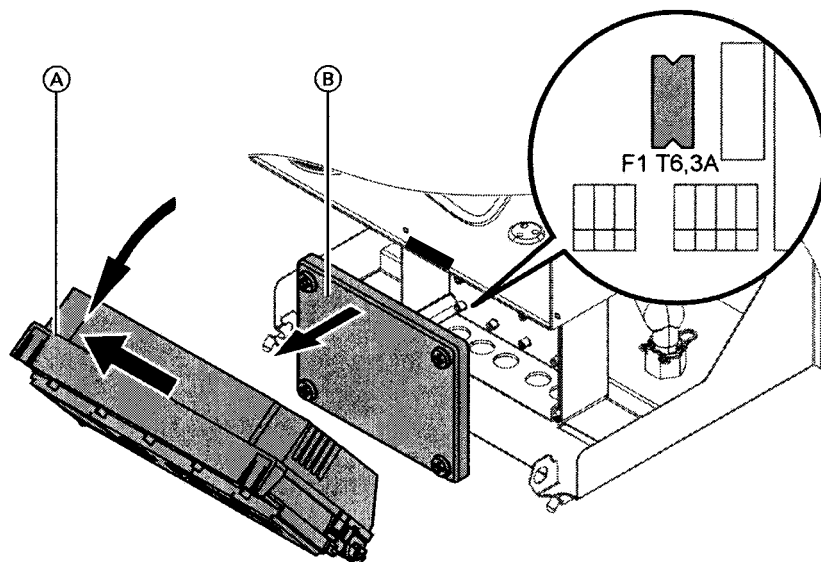
*If the burner control unit cannot be reset after a fault shutdown (F2), even though the boiler water temperature is below approx. 203°F / 95°C, check the fixed high limit.*



1. Pull the leads from fixed high limit **A**.
2. Check the continuity of the fixed high limit with a multimeter.
3. Remove faulty fixed high limit.
4. Coat the replacement fixed high limit with heat conducting paste and install.
5. To reset press "Reset" on the control unit.

# Correction *(continued)*

## Check fuses



Fuse F1 T6.3A

$\frac{3}{4}$ " / 20mm

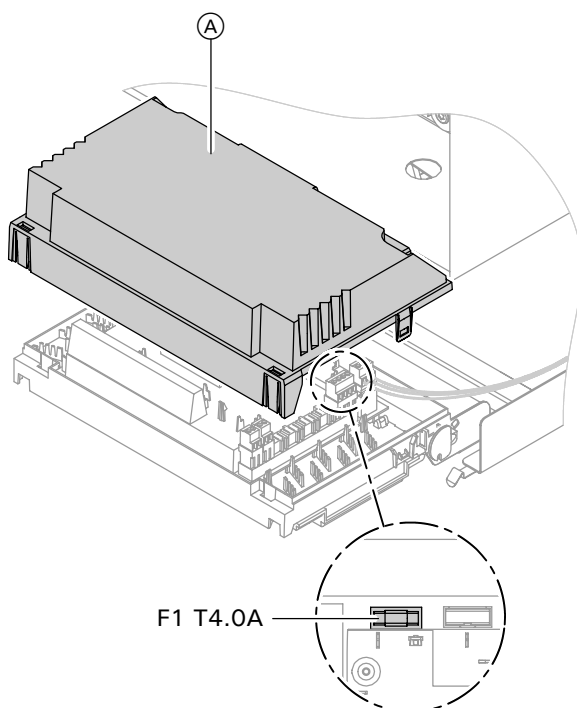
$\frac{1}{4}$ " / 5mm

### Power pump module fuse

1. Switch off main power supply.
2. Flip down and remove control unit (A).
3. Remove power pump module cover plate (B).
4. Check fuse F1 T6.3A (slow blow). Replacements available from Viessmann - package of 10 (PN 7815 580).

### Control unit fuse

1. Switch off main power supply.
2. Flip down control unit.
3. Remove cover (A).
4. Check fuse F1 T4.0A (slow blow). Replacements available from Viessmann - package of 10 (PN 7404 364).



F1 T4.0A

## Additional Information

### Technical Data

Rated voltage:	120 VAC	Max. ambient temperature		Setting of fixed high limit safety cut-out:	210 °F
Rated frequency:	60 Hz	■ at operation:	32 to 104 °F 0 to +40 °C	(fixed setting)	99 °C
Rated current:	6.0 A ~	■ when storing and transporting:	–4 to +149 °F –20 to +65 °C	Main fuse:	max. 15 A
		Setting of adjustable electronic high limit	176 °F 80 °C	Power consumption	
				■ Burner:	max. 105 W
				■ Control unit:	max. 10 VA

		Standard heating boiler	
Boiler Model	Model No.	WB1A 8-24	WB1A 8-30
Natural gas			
CSA input	MBH	29-80	29-100
	kW	8.5-23.4	8.5-29.3
CSA output/DOE <sup>*1</sup>	MBH	26-72	26-90
heating capacity	kW	7.6-21	7.6-26.4
Net I = B = R rating <sup>*2</sup>	MBH	63	78
Heat exchanger surface area	ft. <sup>2</sup>	9.26	9.26
	m <sup>2</sup>	0.86	0.86
Min. gas supply pressure			
Natural gas	"w.c.	4	4
Max. gas supply pressure <sup>*3</sup>			
Natural gas	"w.c.	14	14
A.F.U.E.	%	95.1	95.1
Weight	lbs	95	95
	kg	43	43
Boiler water content	USG	0.82	0.82
	ltr	3.1	3.1
Boiler max. flow rate <sup>*4</sup>	GPM	6.2	6.2
	ltr/h	1400	1400
Max. operating pressure	psig	45	45
at 210 °F/99 °C	bar	3	3
Boiler water temperature			
– Adjustable high limit (AHL) range			
space heating	°F/	68 to 176/	
(steady state)	°C	20 to 80	
DHW production (set point)	°F/	172/	
	°C	78	
– Fixed high limit (FHL)	°F/°C	210/99	
Boiler connections			
Boiler heating supply and return			
NPTM (male) "		¾	¾
Pressure relief valve	NPTF (female) "	¾	¾
Drain valve	(male thread)	¾	¾

<sup>\*1</sup> Output based on 140°F / 60°C, 120 °F / 49°C system supply/return temperature.

<sup>\*2</sup> Net I = B = R rating based on piping and pick-up allowance of 1.15.

<sup>\*3</sup> If the gas supply pressure exceeds the maximum gas supply pressure value, a separate gas pressure regulator must be installed upstream of the heating system.

<sup>\*4</sup> See "Typical System Flow Rates" on page 27 in this manual.

## Technical Data *(continued)*

		Standard heating boiler	
Boiler Model	Model No.	WB1A 8-24	WB1A 8-30
<b>Dimensions</b>			
Overall depth	inches	13.4	13.4
	mm	340	340
Overall width	inches	15.7	15.7
	mm	400	400
Overall height	inches	27.6	27.6
	mm	700	700
<b>Gas supply connection</b>	NPTF (female)“	¾	¾
<b>Flue gas <sup>*5</sup></b>			
Temperature (at boiler re- turn temperature of 86 °F/30 °C)			
– at rated full load	°F/°C	127/53	131/55
– at rated partial load	°F/°C	90/32	90/32
Temperature (at boiler re- turn temperature of 140 °F/60 °C)	°F/°C	167/75	172/78
<b>Flue gas value</b>			
Mass flow rate (of flue gas)			
– at rated full load	lbs/h	79.2	100.1
	kg/h	36.0	45.5
– at rated partial load	lbs/h	33.0	33.0
	kg/h	15.0	15.0
Available draught	Pa	100	100
	mbar	1.0	1.0
<b>Average condensate flow rate <sup>*6</sup></b>			
with natural gas			
– T <sub>S</sub> /T <sub>R</sub> = 122/86°F/50/30 °C	USG/day ltr/day	1.8-2.1 7-8	2.1-2.4 8-9
<b>Condensate connec- tion <sup>*7</sup></b>	hose nozzle Ø in	1	1
<b>Boiler flue gas connec- tion <sup>*8</sup></b>	Ø in/mm	2 <sup>3</sup> / <sub>8</sub> /60	2 <sup>3</sup> / <sub>8</sub> /60
<b>Combustion air supply connection <sup>*8</sup></b>	outer Ø in/mm	4/100	4/100

<sup>\*5</sup> Measured flue gas temperature with a combustion air temperature of 68 °F/20 °C.

<sup>\*6</sup> Based on typical boiler cycles, including partial load conditions.

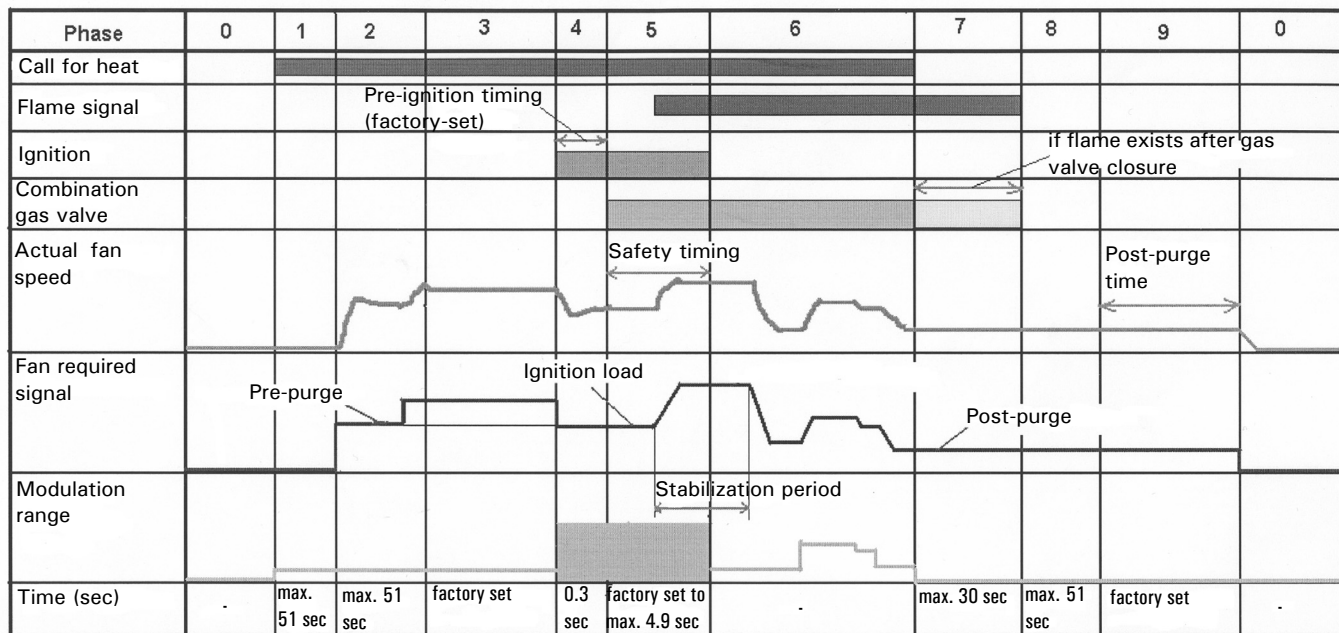
<sup>\*7</sup> Requires 1”/25 mm tubing. See Vitodens 100-W Installation Instructions for details.

<sup>\*8</sup> For detailed information refer to the Vitodens Venting System Installation Instructions (PN 5285 268).

► For information regarding other Viessmann System Technology componentry, please reference documentation of respective product.

## Burner Program Sequence of Operation

### Flame safeguard program sequence of operation



Phase	Explanation
0	Stand by
1	Stand-still status test
2	Pre-purge speed test
3	Pre-purge
4	Pre-ignition
5	Ignition
6	Burner in operation: controller active
7	Proof of closure test / gas valve
8	Post-purge speed test
9	Post-purge

#### Phase 0: Stand by

Complete shutdown until the next call for heat. In this phase both the combination gas valve and the blower are not energized.

#### Phase 1: Stand-still status test (blower)

A call for heat initiates internal blower sensory communications to confirm that the blower is truly in stand-still position. Blower speed measured must be < 300 rpm within a 51 second period.

#### Phase 2: Pre-purge speed test

The air proving switch is tested first using the programmed ignition blower speed. After the air proving switch test, the pre-purge speed (or the forced pre-purge speed) will be controlled within a  $\pm 300$  rpm tolerance in a 51 second period.

#### Phase 3: Pre-purge

Pre-purge cycle starts within the pre-programmed timing. If air proving switch opens during this period, the burner will revert back to Phase 1. Also, if at the end of the pre-purge period expected blower speed is not reached, the burner will revert back to Phase 1.

#### Phase 4: Pre-ignition

The ignition spark is initiated and controlled.

#### Phase 5: Ignition

The gas valve opens during the safety timing period (4.8 secs.). If a flame is detected, this phase ends immediately in < 4.8 secs. If the flame is not established after 3 trials, the burner will lock out and will require a manual reset.

#### Phase 6: Burner operation

At the end of the flame stabilization period (10 sec.), a release for modulation occurs and the burner temperature controller will take over from the flame safeguard.

#### Phase 7: Combination gas valve proof of closure test

If during the normal operation of the burner a controlled (or uncontrolled) shut-down occurs, a complete mechanical and electrical gas valve proof of closure test will be performed by the flame safeguard. After a successful mechanical and electrical proof of closure test, the flame safeguard will expect that the flame is not present. If, however, the flame existed for a period of > 30 seconds, the flame safeguard will go into permanent lock-out.

#### Phase 8: Post-purge speed test

Both gas valves are closed during this phase.

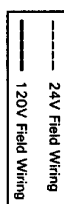
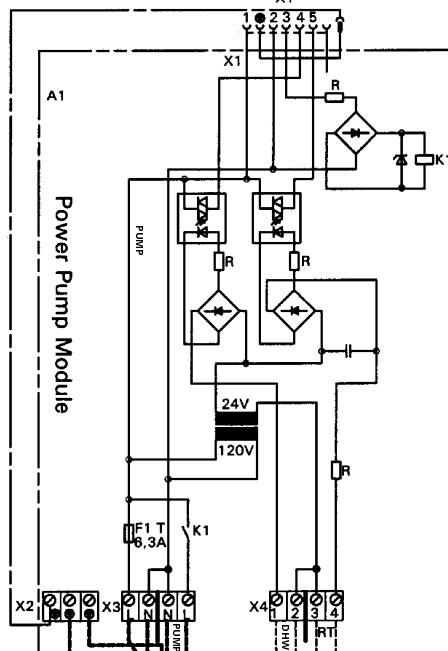
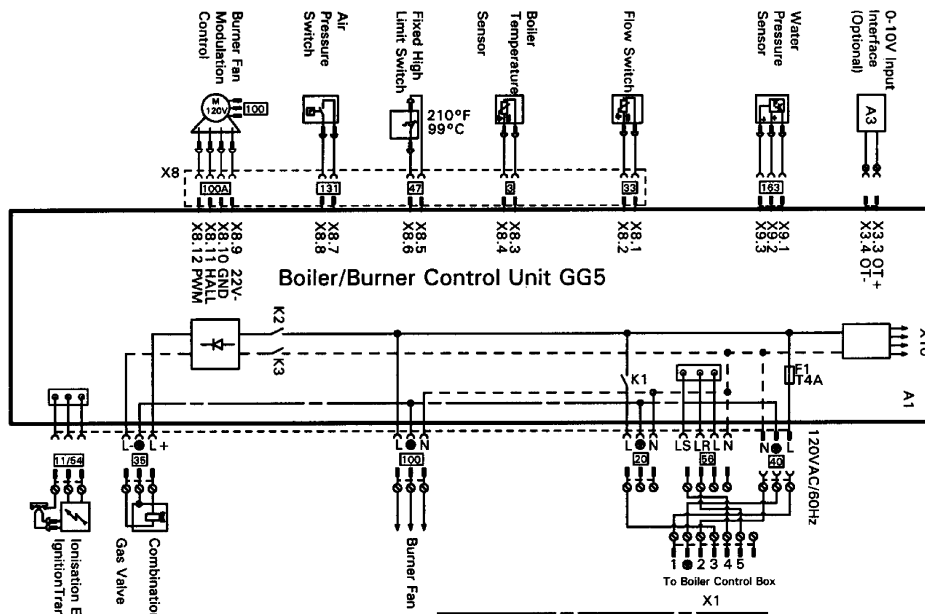
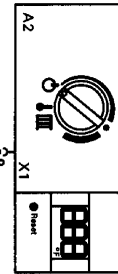
#### Phase 9: Post-purge

Post-purge occurs during the programmed period. If the fixed high limit trips during normal operation, the blower will purge for 10 min. to cool the heat exchanger.

# Wiring Diagram

Vitodens 100 WB1A 8-24 and WB1A 8-30 (NATURAL GAS ONLY)

User Control and Display Interface



**WARNING! DISCONNECT POWER BEFORE SERVICING BOILER.**

CAUTION: LABEL ALL WIRES PRIOR TO DISCONNECTING. MISWIRING OR UNLabeled WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION AFTER SERVICING.

IF ANY OF THE ORIGINAL WIRE AS SUPPLIED REPLACES WITH ITS EQUIVALENT.

**Boiler/Burner Control Unit GG5**

- A1 Main Circuit Board
- A2 User Control and Display Interface
- A3 0-10V Input Interface (Optional)
- 101 Boiler Temperature Sensor
- 102 Ionisation Electrode
- 103 Flow Switch
- 104 Combination Gas Valve
- 105 Power Supply 120VAC/60Hz
- 106 Fixed High Limit Switch
- 107 Ignition Transformer
- 108 Burner Fan
- 1000 Burner Fan Modulation Control
- 1001 Air Pressure Switch
- 1002 Water Pressure Sensor

**Power Pump Module**

- A1 Main Circuit Board
- K1 Pump Relay
- X1 Interface, to Boiler/Burner Control Unit GG5
- X2 Ground Conductor
- X3,1-2 Main Power Supply 120VAC/60Hz
- X3,3-4 Pump Output
- X4,1-2 External Demand Input DHW
- X4,3-4 Room Thermostat (T-T connection)

External Connections (Field Wiring)

5346 438 07/07

## Parts List

### Model No.

Serial No. \*1

WB1A 24 7246174□□□□□□□□

WB1A 30 7246175□□□□□□□□

### Ordering Replacement Parts:

Please provide Model and Serial Number from rating plate (A) when ordering replacement parts. Order replacement components from your Viessmann distributor.

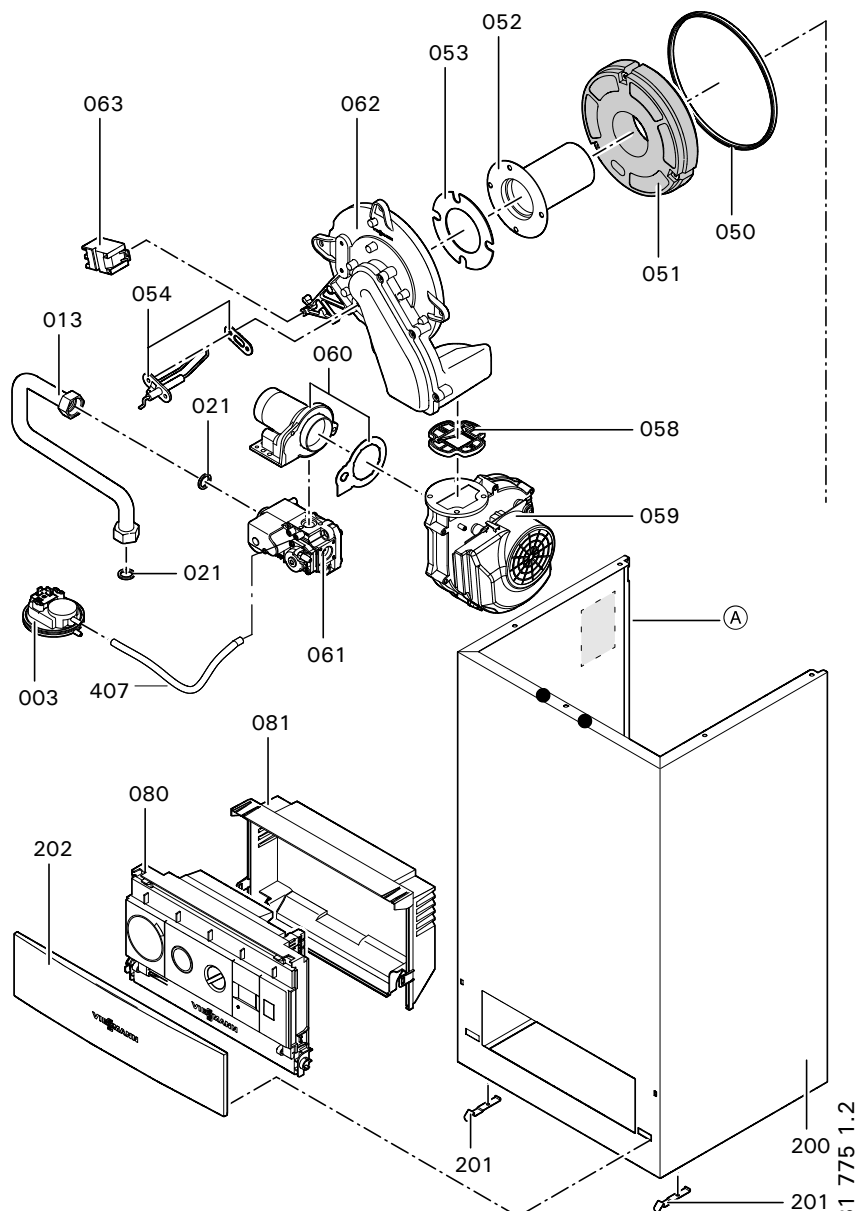
### Parts

- 003 Air pressure switch
- 013 Gas connection pipe
- 021 Gasket set for gas connection pipe, 17x24x2mm
- 050 Burner gasket
- 051 Combustion chamber door refractory
- 052 Burner tube
- 053 Burner tube gasket
- 054 Ignition and ionization electrode block
- 058 Flapper
- 059 Radial fan RG130, 120/1/60
- 060 Air + gas inlet venturi Type 002
- 061 Gas valve VK4115V, 120/1/60
- 062 Burner mounting flange assembly
- 063 Ignition transformer module ZIG 2/12
- 080 Control console
- 081 Control housing, rear
- 200 Front panel
- 201 Spring clip set for front panel
- 202 Flip-down cover
- 407 Pressure switch hose

### Other Parts (not illustrated)

- 300 Touch-up spray paint "Vitowhite"
- 301 Touch-up paint stick "Vitowhite"
- 400 Installation fittings
- 401 Installation / Service Instructions
- 402 Operating Instructions
- 403 Quick Start-Up Guide
- 404 Warranty Sheet Condensing
- 405 Parts List

(A) CSA rating plate  
(with part number)





## Parts List *(continued)*

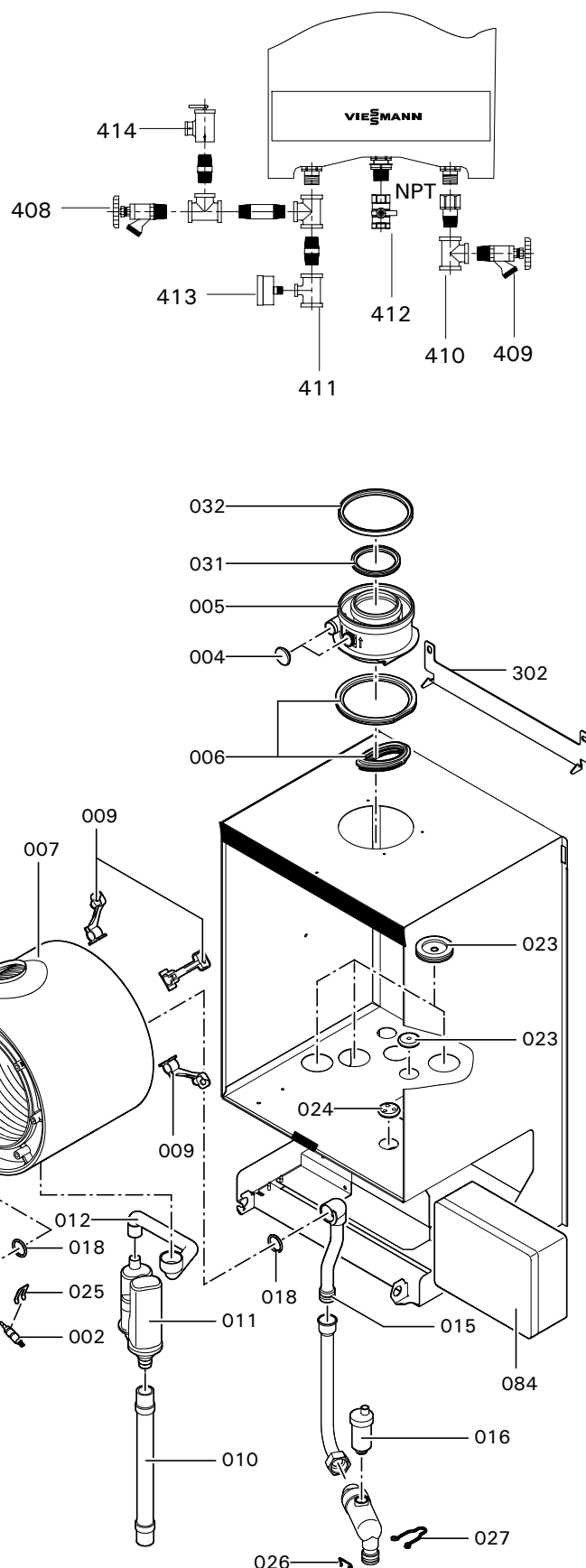
### Parts

- 001 Fixed high limit, 210°F/99°C
- 002 Boiler temperature sensor
- 004 Test port cap (set of 2)
- 005 Vent pipe adaptor
- 006 Gasket set for flue gases  
(order glue, part 095 below)
- 007 Heat exchanger assembly, ASME
- 008 Combustion chamber refractory
- 009 Support bracket set  
for heat exchanger
- 010 Condensate hose, 400mm
- 011 P-trap
- 012 Condensate pipe
- 014 Heating supply connection pipe
- 015 Heating return connection pipe
- 016 Air vent w shut-off base, 3/8"
- 017 Water pressure sensor
- 018 O-ring set for  
heat exchanger, 21x3mm
- 023 Sealing grommet set
- 024 Sealing grommet
- 025 Fastener set for sensors
- 026 Locking clip set for return
- 027 Fastener set for return pipe
- 028 Fastener set for supply pipe
- 031 Flue gasket, 60mm
- 032 Flue gasket, 100mm
- 033 Flow switch, VK315M
- 084 Power/pump module, 120/1/60
- 302 Wall-mount bracket

- 408 Boiler drain
- 409 Boiler fill
- 410 Boiler water return
- 411 Boiler water supply
- 412 Gas shutoff valve
- 413 Pressure gage
- 414 Pressure relief valve

### Other Parts (not illustrated)

- 019 O-ring set for  
supply/return, 18x3mm
- 020 Gasket set for water  
pressure sensor, 10x2mm
- 022 Gasket set for P-trap, 19x2mm
- 029 Fastener set, 10mm
- 080 Connection cable,  
power/pump module
- 083 Fuse, T4.0A/250V (pkg. of 10)
- 090 Wiring harness, X8
- 091 Wiring harness, X9
- 092 Connecting cable, fan
- 093 Connecting cable, gas valve
- 094 Connecting cable,  
ignition transformer module
- 095 Glue
- Ⓑ ASME/NB Rating plate  
(affixed to heat exchanger with 2  
rivets)



Maintenance Record

Measurements	Service date: by:	Service date: by:	Service date: by:	Service date: by:	Service date: by:	Service date: by:	Setpoint value
Static pressure	"w.c.						max. 14 "w.c.
Running pressure (supply pressure)							
<input type="checkbox"/> Natural gas	"w.c.						4-14 "w.c.
Carbon dioxide content CO <sub>2</sub>							
■ at lower end of rated input range (low fire)	vol.-%						
■ at upper end of rated input range (high fire)	vol.-%						
Oxygen content O <sub>2</sub>							
■ at lower end of rated input range (low fire)	vol.-%						
■ at upper end of rated input range (high fire)	vol.-%						
Carbon monoxide content CO							
■ at lower end of rated input range	ppm						Never exceed 50 ppm air-free
■ at upper end of rated input range	ppm						Never exceed 200 ppm air-free

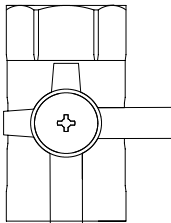
## Lighting and Operating Instructions

### FOR YOUR SAFETY READ BEFORE OPERATING

**W A R N I N G:** If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

- A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
- B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.  
**WHAT TO DO IF YOU SMELL GAS**
  - Do not try to light any appliance.
  - Do not touch any electric switch; do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.
- D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

### OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above on this label.
2. Set thermostat or other operating control to lowest setting.
3. Turn off all electric power to the appliance.
4. This device is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.  
**Manual gas shutoff**


Closed

Open
5. Close main gas shut-off valve.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, **STOP!** Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
7. Open main gas shut-off valve.
8. Turn on all electric power to the appliance.
9. Set thermostat or other operating control to desired setting.
10. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas supplier.

### TO TURN OFF GAS TO BOILER

1. Set thermostat or other operating control to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Close main gas shut-off valve.

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